BOEING

NATO: A BUSINESS HISTORY

Volume I of three

by Robert R. Foxcurran

1986 revision

NATO: A BUSINESS HISTORY

Volume I of three

by Robert R. Foxcurran

1986 revision

This business history is based upon a research report originally submitted in 1979 for an M.B.A. from the University of Washington, Seattle. The research was performed under an internship program sponsored by the Contracts Department of The Boeing Aerospace Company between June 1977 and June 1978 in support of planning for the NATO AWACS program. The report has been substantially rewritten and undergone periodic updating since that time.

This information is considered to be Competitive Sensitive by The Boeing Company. It has not been released for broader dissemination to industry. At this juncture it is available outside of Boeing for U.S. Government and NATO staff personnel only.

THREE DECADES OF MULTINATIONAL COLLABORATION FOR DEFENSE PROCUREMENT WITHIN THE NORTH ATLANTIC ALLIANCE — A BUSINESS HISTORY

by

ROBERT R. FOXCURRAN

A research report submitted in partial fulfillment of the requirement for the degree of

MASTERS OF BUSINESS ADMINISTRATION

UNIVERSITY OF WASHINGTON

1979

Research performed within the framework of the

Boeing - University of Washington M.B.A.

Internship Program

Co-sponsored by Boeing and the Air Force
Business Research Management Center

NATO: A BUSINESS HISTORY

BY

Robert Rolston Foxcurran

(ORIGINALLY RELEASED UNDER THE TITLE—THREE DECADES OF MULTINATIONAL COLLABORATION WITHIN THE NORTH ATLANTIC ALLIANCE — A BUSINESS HISTORY)

ABSTRACT

This is a business history treating multinational collaboration for defense procurement within the North Atlantic Alliance. Its primary purpose is to begin filling a major gap in NATO-related literature on collaboration in defense procurement.

The question toward which this paper is directed is, concerning defense contracting, what have the four letters N-A-T-O come to mean over the last 30 years. This question is answered, inasmuch as it can be, principally by approaching it three-dimensionally:

(1) Distinguishing among three principal areas of institutional activity: NATO Infrastructure; NATO Maintenance and Supply activity; and Weapon Systems collaboration.

(2) Since the above dimension covers only part of the picture, it is important to delineate the 8 significant Modes of ad hoc industrial collaboration among the members for defense procurement at the systems level. Starting from the original mode which involved license production in one European nation, the modes of industrial collaboration proliferated during the 1950's and 60's to the eight we have today.

(3) Within the framework of analysis set by the above two dimensions, are the case studies of the individual projects, constituting a patchwork of many of the lessons learned and most of the intergovernmental, interindustrial and contractual arrangements utilized (this dimension being the overwelming bulk of the work).

This study is primarily descriptive in nature. However, through the 8 Modes of industrial collaboration I attempt to indicate not only where the Alliance has been, but where it seems to be going in this respect.

ACKNOWLEDGEMENTS

Special thanks to

John O'Hara, Frank Shrontz, Claus Claesson, Tony Tucillo, Kent McCormick, Bill Lambert, Chuck Schmeizl and Tim Slyne for initiating the study.

Also thanks to

T. J. Loveland, Marnie Olson, Diane Criez, Ed Ritti, Gene Myers, Pen Moed, Allen Raines, Erwin Molnar, Tom Lindberg, Jack Wagstaff, Erik Fromm, Colonel Ron Carlberg, Captain Pete Perkowski, Major Lyle Lockwood, Jan Westbrook, Joe Pica, Tom Savage, Pete Day, Alex Munro, and Professors Sumner Marcus and Dennis Strong for their considerable assistance throughout the study effort.

INTERVIEWS
(in person and by telephone)

Joe Loveland	U. S. Mission to NATO
Stanley Beck	
Dr. Soos	
Mr. Mullen	
Cmdr. Luper	
Col. Harvill	
Lt. Col. Price	
Mr. R. Schaus	NATO International Staff
Mr. LeJeune	
Mr. Mills	
Lt. Colonel Meyer	Hq, USAF (AR-RDPNAF) - AF NATO AEW&C Office in the Pentagon
Lt. Colonel Steiner	NATO AEW&C Subgroup 3 on Finance & Contracts
Lt. Col. John White, Jr.	Hq, USAF/CVAR
Major Marshall	Hq, USAF/CVAR
Joe Miller	OASD/ISA
Lt. Col. Dick Kehl	F-16 SPO
Colonel Holtzclaw	Pentagon
Captain Barker	AWACS Task Force
Dr. Leslie Norton	AFIT/SLGM
Lt. Col. Groth	OASD/ISA
Steve Rowen	Raytheon
Thomas Peterson	"
Bill Mahoney	"
Gordy Howe	"
Guy desLovere	
Bill Bodenbaugh	General Electric
Robert Reed	Hughes Aircraft

BOEING

John O'Hara	Allen Raines	Nick deVogel
Frank Shrontz	Tom Savage	Erik Fromm
Bill Lambert	Alex Munro	Tom Manning
Kent McCormick	Pete Day	Mike Olszewsky
Chuck Schmeizl	Gene Myers	Joe Madden
Tony Tuccillo	Dick Merritt	Ed Ritti
Tim Slyne	Rodney Frazer	John McClean
Erwin Molnar	John Ciechon	Len Savage
Tom Lindberg	Joe Pica	Duane Roske
Jack Wagstaff	Jim Barton	Ted Gimlin

TABLE OF CONTENTS

NATO: A Business History

PART I

THE NATO INFRASTRUCTURE PROGRAM'S C^3/I PROJECTS

CHAPTER 3

FOXC/Disk 196/TofC/Ch. 1 p. 1-27

PART II - INTRODUCTION

MODE #1—LICENSED PRODUCTION IN ONE EUROPEAN NATION OF A SYSTEM DEVELOPED IN THE U.S. OR ELSEWHERE IN EUROPE

CHAPTER 6

FOXC/Disk 196/TofC/Ch. 1 p. 1-27

FOXC/Disk 196/TofC/Ch. 1 p. 1-27

MODE #3—CODEVELOPMENT AND COPRODUCTION AMONG EUROPEAN NATIONS

CHAPTER 8

FOXC/Disk 196/TofC/Ch. 1 p. 1-27

MODE #4—PRODUCTION OF A EUROPEAN DEVELOPED SYSTEM IN THE U.S.

CHAPTER 9

FOXC/Disk 196/TofC/Ch. 1 p. 1-27

MODE #7—TRANSATLANTIC JOINT PRODUCTION AND/
OR SYSTEMS INTEGRATION BY A U.S. LED INDUSTRIAL TEAM

CHAPTER 12

The NATO AWACS project history has been withdrawn for a major revision

MODE #8—MULTI-SYSTEM PACKAGE DEALS

NATO: A BUSINESS HISTORY

FOREWORD

The fundamental question that this paper is attempting to answer is, "What is NATO, with respect to defense contracting?"

The primary purpose is not to come up with recommendations in the subject area, but rather to provide a corporate memory as a step toward eventually writing a primer or handbook for improving the general understanding of what NATO signifies in this respect. This work therefore tends to more a compendium of case studies, or even an encyclopedia of project histories with background on the institutional development of NATO.

Almost the totality of the existing literature falls into one or more of the following three categories:

- a brief, general overview of the subject area, of somewhere between 3 and 90 pages in length, and generally quite dated at that.

- specific studies of one project or one significant aspect of the subject area (e.g., the MBT-70 and F-16 projects, or licensing in NATO, NATO Infrastructure Program, and standardizing tactical doctrine).

- a general presentation of the non-rational nature of the Alliance's allocation of its limited resources followed by an appeal for increased solidarity, i.e. political will, and collaboration so as to lessen the waste, and/or recommendations for reforms, ranging from the minor to the revolutionary.

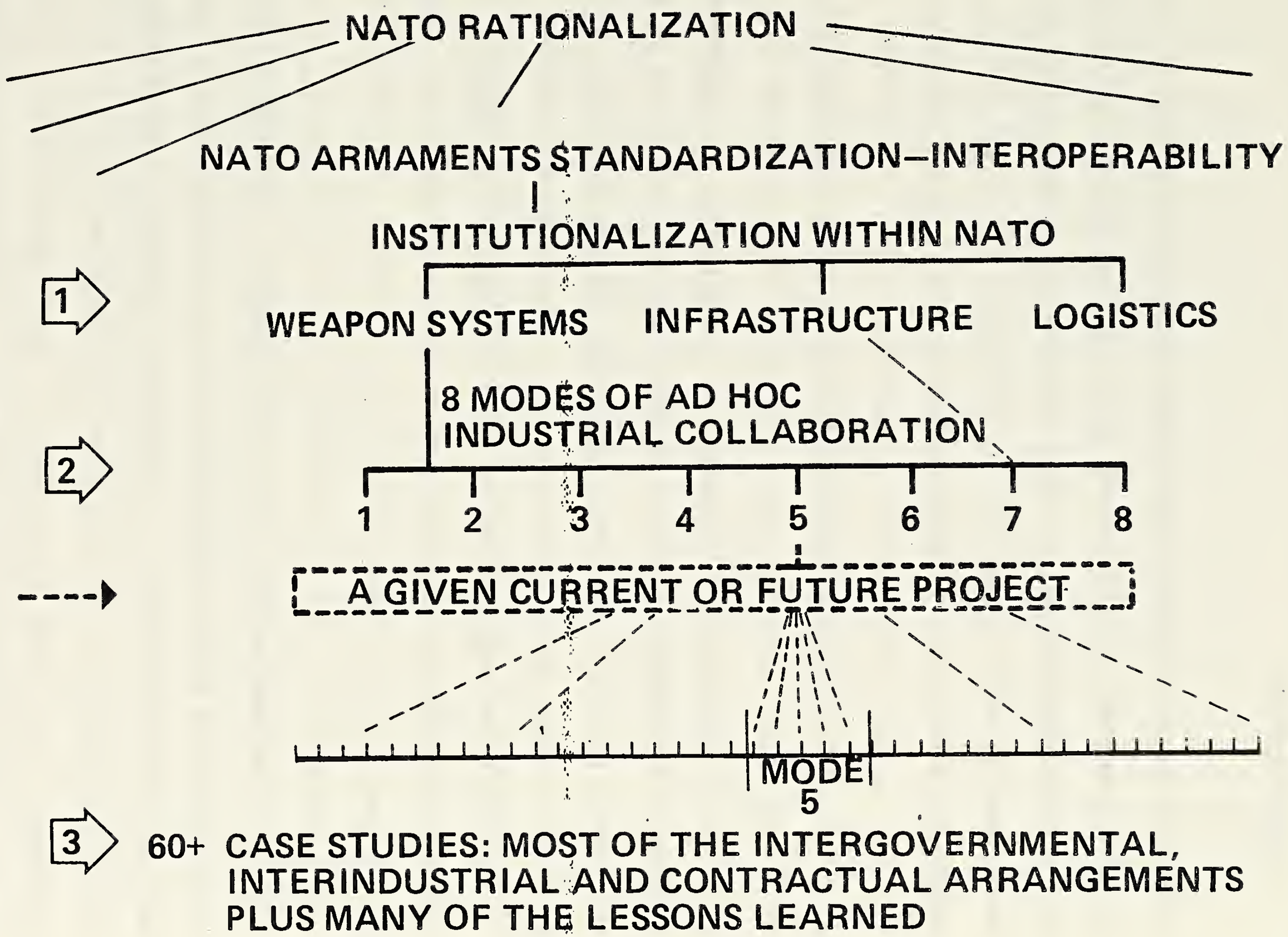
As such, what has been needed, in this author's evaluation of the problem, is some work that can provide a broader and deeper understanding of the 'Three Decades and a half of Multinational Collaboration for Defense Procurement Within the North Atlantic Alliance.' There is a need for a collection of organizational studies and project histories that can distill the large amount of know-how accumulated in the area. It must be one that is relatively easily digestible by the large number of people involved in the subject area from both government and industry. Basic knowledge of other projects will allow for a more effective brokerage of information and greater cross-fertilization. I feel that this paper can serve as a major step toward fulfilling this need.

An earlier draft of this study represented the author's Master's Thesis and originated within the framework of the Boeing-University of Washington MBA intern program (i.e., paid for by Boeing) - later receiving the cosponsorship of the Air Force Business Research Management Center. Since that time it has been periodically updated in support of on-going business activities at the Boeing Aerospace Company and in furtherance of our corporate memory. The views expressed herein are those of the author and do not necessarily represent those contributing to or supporting the study.

This paper is founded on the assumption that whatever will be accomplished as a result of the present NATO RSI effort will be evolutionary in nature, not revolutionary. Under the pressure of events, there will be a continual refinement of the vast amount of experience gained and techniques used over the last 34 years -- the odds being very much against any revolutionary breaks with the past, or brilliant new mechanisms, or drastically altered consciousness.

The approach used is to describe in Part I of the history NATO's institutional activities in three areas of defense procurement:

Conceptual Framework



862127-1

- Infrastructure;
- Logistics, and;
- Weapon Systems.

Within the first two of these there is a limited domain in which there has been reasonable success in institutionalizing a role for NATO and its subsidiary bodies (NPLOs). While most Alliance infrastructure (i.e., fixed facilities, installations) activity takes place on a purely national basis, and almost all maintenance and supply activity occurs on a unilateral or bilateral basis, NATO has assumed special roles within which multi-lateral and often Alliance-wide common procurement activity is performed. The NATO Infrastructure Program is a highly decentralized common defense procurement program dating from 1950. As of the early 1980's annual expenditures had surpassed 1 billion dollars, divided roughly 2/3-1/3 between brick and mortar, and sophisticated projects. The U.S. industrial share is around 15-20% of the total, almost all of which involves sophisticated projects in the areas of C^3/I, i.e., U.S. industry corners about half of the contracts involving sophisticated equipment. The principal Maintenance and Supply NPLO, NAMSA, has been involved primarily with U.S.-developed systems in the European national inventories and those systems whose procurement was funded through the NATO Infrastructure Program. NAMSA's annual turnover reached $180 million in 1978.

In the third and most significant area, weapon systems, a series of institutional alliance-wide arrangements prior to 1966 failed to achieve the desired results. Since 1966, NATO has settled for a lower profile, i.e., serving as an information and coordination conduit for ad hoc collaboration at the transnational (nation-to-nation) level. As emphasized by Vandevanter in his 1964 Rand study, the lesson learned from the institutionalized approaches of the 1950's and early '60s were that NATO's chief task should be that of a middleman and catalyst, not a director and judge. In this area, faced with the worsening cost/budget squeeze, the alternative has not been Alliance-wide, but transnational

projects. Collaboration will most certainly continue along this line be it by means of ad hoc arrangements reached through, or independently of, NATO's institutions and procedures.

In Part II of the paper North Atlantic industrial relationships for ad hoc collaboration in systems development and/or production among firms of the member states are classified into 8 modes on the basis of several key variables. These variables are representative of some of the major constraints within which industrial collaboration must work and have been important in shaping its evolution. These variables are:

- Whether the collaboration involves development and/or production.

- The nature of business relationship at the industrial level (i.e., part of a Transnational venture, licensing on a bilateral basis, or a barter arrangement involving subcontracting and/or some sort of external offset.

- Whether one or more than one national industry is collaborating with the U.S. on the European end.

- The U.S.-European relationship and the direction of the flow of technology across the Atlantic--distinguishing between the U.S. and Europe on the basis of the size of the domestic market and the domestic industrial bases, national competition and export policies, world role, and financial, industrial, and technological resources, etc.

- Differentiating between the medium powers (France, the FRG and the U.K.) and the smaller European national economies on the basis of their financial, industrial and technological resources.

Following are the 8 Modes, and some of there components projects:

MODE #1—License production in one European nation

French Vampire
Italian M-48
Dutch Hawker Hunter
German Noratlas
German G.91
British S-55
Italian M-113
German UH-1D
British S-61
Italian Leopard I
German CH-53G
Spanish F-5
Italian CH-47C
Italian Swordfish

MODE #2—License production in Europe by a multinational consortium of a system developed in the U.S.

Hawk
F-104G
Bullpup
Sidewinder (AIM-9B)

- - - - - - - - - - - - -

AIM-9L
Patriot
MLRS
Copperhead

MODE #3—European joint development and producton

Atlantic
Transall
Franco-German tank (AMX-30/Leopard I)
Martel
MRCA Tornado
Alpha Jet
Hot, Milan and Roland
ASSM
The Tri-partite Minehunter

MODE #4— License production and/or further development in the U.S. of a system developed in Europe

Canberra bomber
WM/22 and WM/28 fire control system
RATAC ground surveillance radar
AV-8B Harrier fighter
Roland surface-to-air missile system
SA-366 Dauphin helicopter for the U.S. Coast Guard
76mm Compact Naval Gun
USN T-45 (Hawk trainer)
Leopard II evaluation by the U.S. Army

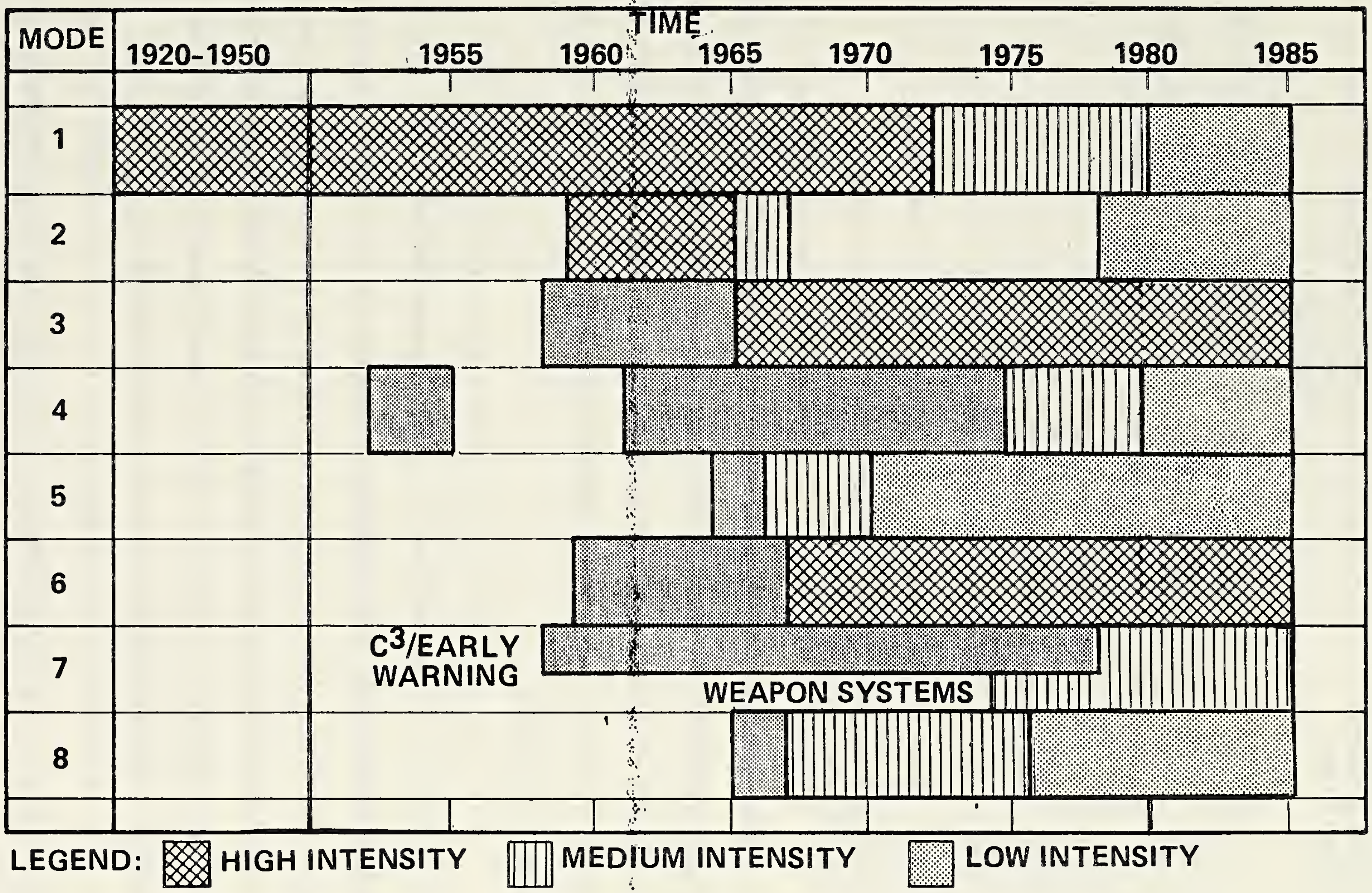
MODE #5—Transatlantic joint development

MBT-70
AVS fighter
Mallard communications system
CFM-56 engine
PHM naval hydrofoil
Seasparrow surface missile system
Seasparrow Lightweight Missile System (SLMS)

MODE #6—Bi-laterial offset arrangements for the purchase of a foreign system

British F-4
British F-111K
German F-4
Swiss F-5
Belgian MAG-58
German 120mm Tank Gun

HISTORICAL UTILIZATION OF INDUSTRIAL COLLABORATION FOR WEAPON SYSTEM ACQUISITION IN THE NORTH ATLANTIC



862127-2

Belgian, Dutch and Norwegian Leopard I's
Belgian Mirage 5
Danish Draken
British Exocet
Belgian Improved Hawk
British, Canadian, and Spanish CH-47's
Dutch Leopard II
Canadian/Lockheed CP-140
CF-18
Spanish F-18
Greek F-16/Mirage purchase
Turkish F-16
French AEW

MODE #7— Transatlantic joint production (or systems management) by a U.S. led consortium (i.e. involving no significant joint development)
ACE-High communications system
NATO Air Defense Ground Environment (NADGE)
NATO SATCOM III satellite ground terminals
HELIP (European Improved Hawk)
F-16
AWACS

MODE #8—Package Deals and the "Family of Weapons" concept
The AFVG and Jaguar Fighter Package
The Anglo-French Helicopter Package (Puma, Gazelle, Lynx)
The "Family of Weapons" Concept

The reading of this history, or better yet package of histories, by people experienced in defense acquisition will tend to lead to a posing of more questions than it could possibly ever answer, vis-a-vis any given project. But maybe these questions will be posed in a timelier and clearer manner in the future, and with a better idea of where to look for relevant precedents.

And finally, one general comment on the cases presented herein. In each one it is apparent that not only the weapon system project itself is unique, as in any national defense contracting environment, but the definition and nature of the individual contracting authority(s), contractor(s) and contracting relationship(s) over time, each present their own unique mix of elements. They do retain, however, many individual elements in common. The same applies to the many lessons learned.

May the data base provided herein serve as another step towards a clearer definition and management of such enterprises in the future.

Disk #196/Foreward/New/6

Chapter 1

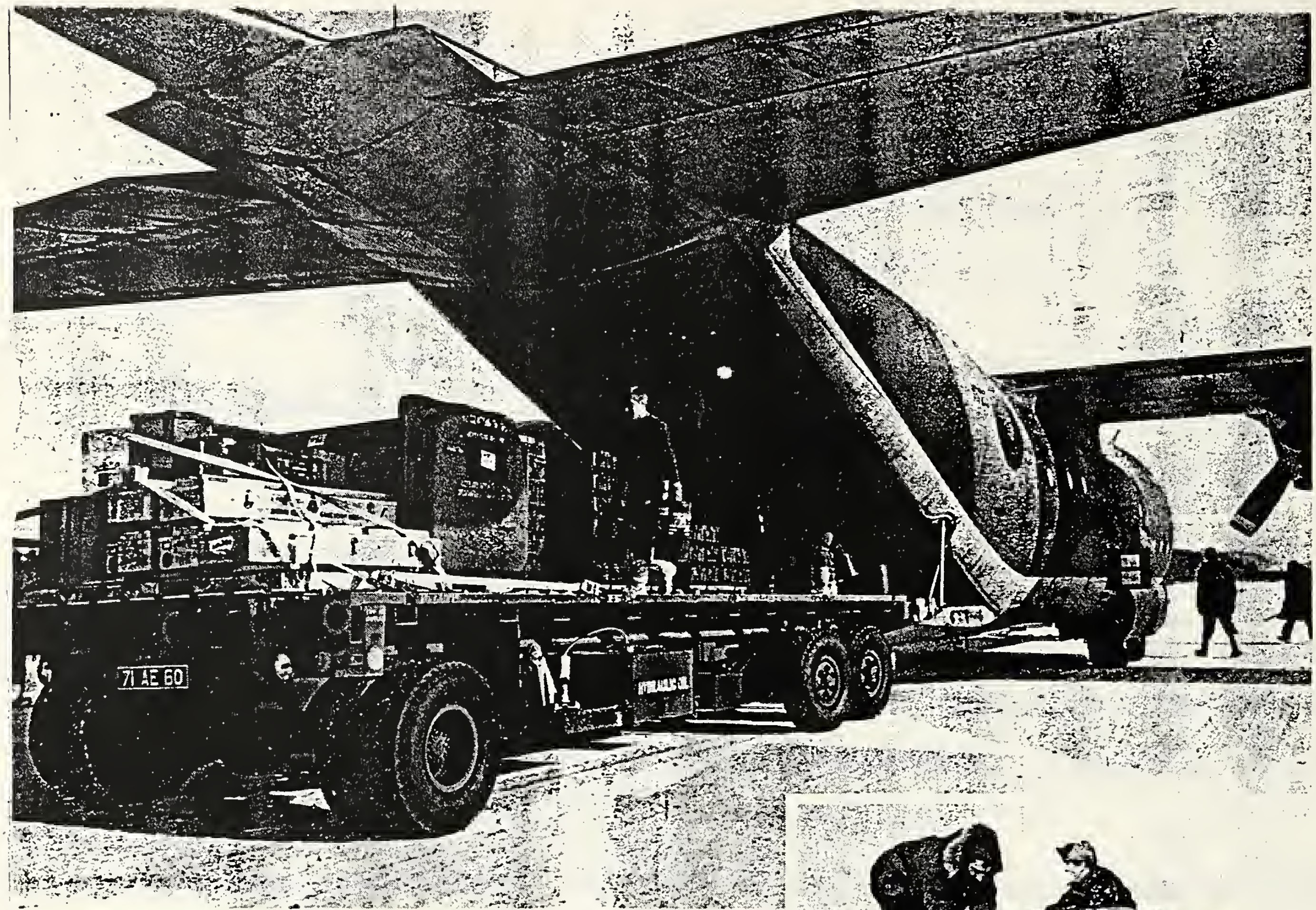
Introduction to the Problem

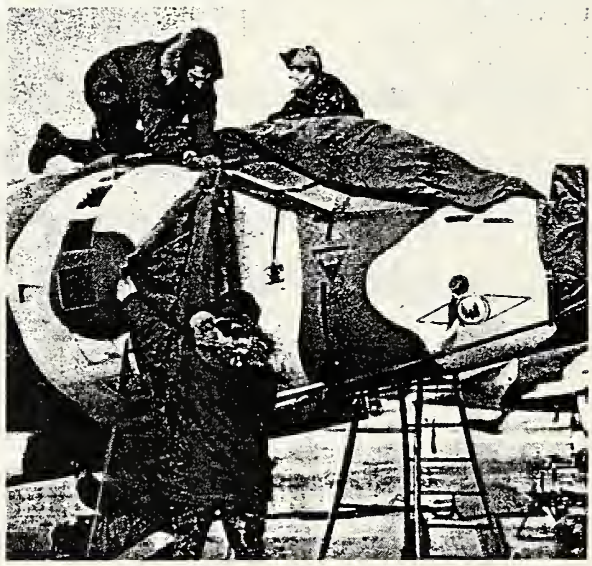
A. The North Atlantic Alliance's Need for Increased Defense Collaboration and the Increased Dependence of the U.S. Defense Industry on Foreign Sales

This is a study of the evolution of multinational collaboration amongst the 15 member states of the North Atlantic Alliance in the area of defense procurement. The aim is to provide historical depth and broader perspective for present and future developments in this area.

With the onset of the post-Vietnam era in the early 1970's two fundamental changes in orientation simultaneously occurred that contributed to resurgence in U.S. participation in collaborative efforts with NATO allies. One took place within the U.S. Government and military and one within the U.S. defense industry. Both, however, were mutually reinforcing.

First the U.S. refocused its primary overseas military preoccupations away from South East Asia and back to Western Europe. With this came a refound awareness on the part of the U.S. Government and military that the independent national defense procurement efforts in NATO had resulted in a non-rational allocation of the Alliance's limited defense resources of serious proportions. The term rationalization is used to cover the broad effort now underway to ensure more efficient use of alliance resources in both weapons and non-weapons fields, including the standardization and interoperability of armaments, military doctrine, force structure, training, communications and logistics. To provide





Rapid Deployment Tested in NATO Exercise

Rapid deployment of back-up forces and air support of North Atlantic Treaty Organization troops defending northern Norway were tested during joint NATO Anorak Express exercises in Norway recently. Troops, ships and air forces of seven NATO nations participated, those of the U. S., Britain, Norway, the Netherlands, Canada, West Germany and Italy. About 24,000 troops were involved in the exercise. Royal Air Force Lockheed Hercules transport aircraft unloads supplies (above) at Bardofuss, Norway, during the exercise. Aircraft is based at RAF Lyneham in Britain. Ground crewmen (right) cover an RAF/British Aerospace Harrier from No. 1 Squadron at Tromso, Norway. Harriers provided close support to ground troops participating in Anorak Express. Westland Puma helicopter of RAF No. 33 Squadron operates in conjunction with a British Volvo snow vehicle (below) during the exercises in northern Norway. Note Norwegian air force Bell UH-1B helicopters in rear.

some rough numbers for the size of problem faced, in 1974 General Goodpaster (SACEUR 1969-1974) gave the figure that, through standardization the overall combat effectiveness of NATO's forces could be increased by 30 to 50%. Also in 1974, Thomas A. Callaghan, Jr. provided a $10-$20 billion a year figure to the Alliance's waste of defense resources due to lack of standardization.

In response to this need for greater NATO Rationalization, Standardization Interoperability (RSI), the U.S. Congress and the DOD initiated its current NATO RSI policy, between August, 1974 with the Nunn Amendment to the FY 1975 Defense Appropriations Bill (Section 302 of Public Law 93-365) and February, 1975, when the OASD/ISA and OASD for Program Analysis and Evaluation sent a joint memorandum to the services designed to support NATO RSI.

Secondly, and again closely related to the wind-down of the war in South East Asia, was the significant shift toward foreign military sales.

> While U.S. defense procurements in the post-Vietnam period dropped from a 1968 high of $44 billion to a 1975 low of $17 billion (in constant dollars), foreign military sales jumped in the first half of the 1970's from about $1.5 billion to over $14 billion a year. Additionally, there was a qualitative shift in sales, from old equipment to first-line equipment and manufacturing capability (even complete plants). Thus, the U.S. defense industry became dependent on foreign military sales, since their magnitude was comparable to that of U.S. expenditures and, in many sectors, even larger. (In 1976 the Army Missile Command bought 70 percent of its procurements for foreign military sales, and in the same year U.S. military aircraft production was greater for foreign sales than for domestic military needs.)[1]

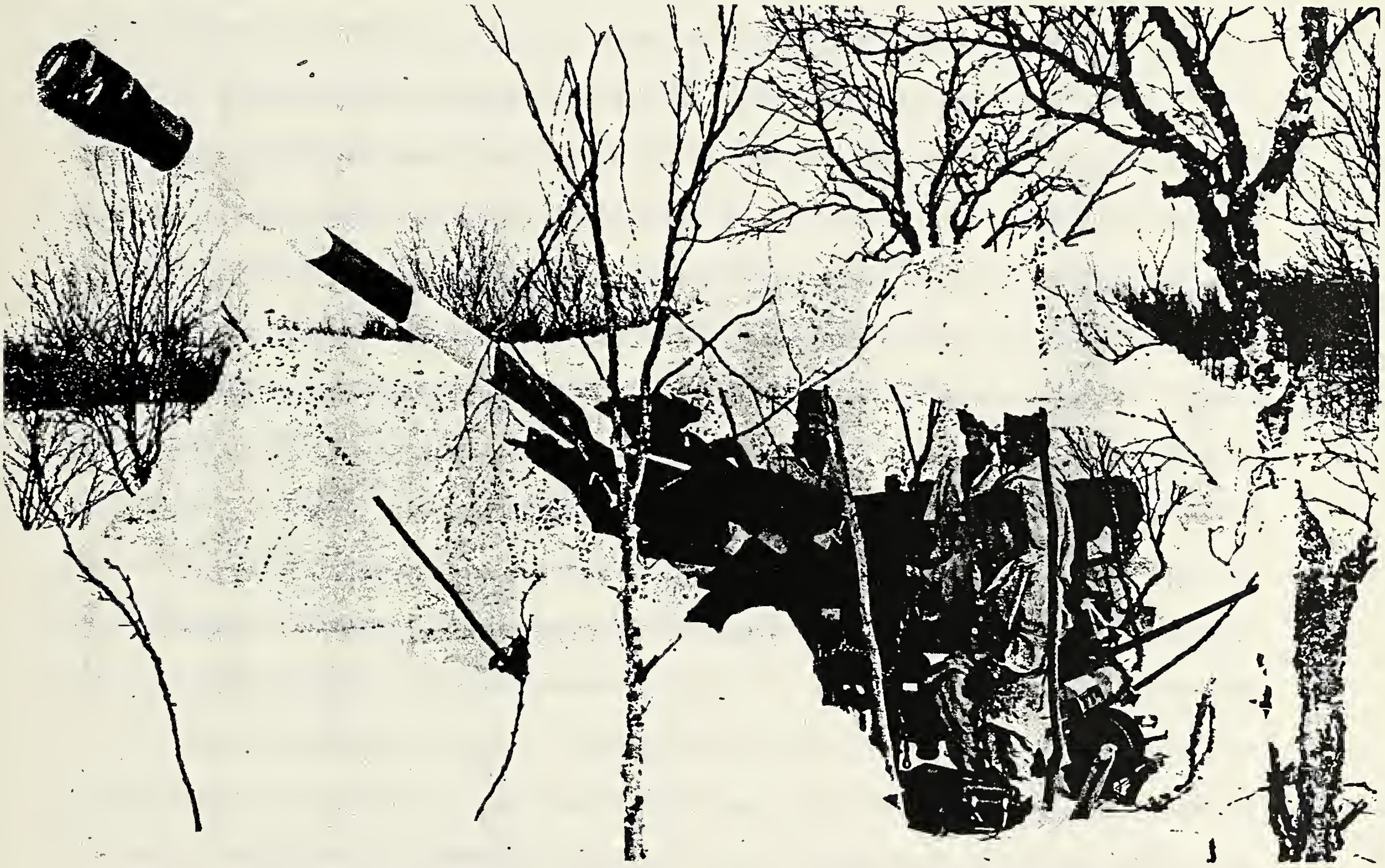
---

[1] Jacques S. Gansler, The Defense Industry, The MIT Press, Cambridge, Mass., Copyright 1980, p. 26.

This increased dependence on foreign markets naturally heightened U.S. industry's vulnerability to foreign customer demands for a piece of the action for their own industry. Moreover, with the resurgence of the Western European arms industry, and one heavily oriented toward exports, competition within NATO and in other world markets had considerably heightened. In this environment it became increasingly apparent that to the three primary proposal components of perfor-mance, price, and delivery, a fourth component, industrial collaboration now often had to be added.

The new British 105mm light gun makes its debut in a NATO exercise in Norway

Photo: Sergeant Jim Clark UK Land Forces



B. International Trade and Neo-Mercantilism

The roots of the problems facing Alliance collaboration in defense procurement reach to the very core of the international political order—national sovereignty, and its manifestations in national defense and national economic policies.

From the Alliance's beginnings the dynamics of economic competition among these 15 sui generis national entities have been more significant than cooperation within the limited intersections of the 15 sets of national interests in defense related matters. The Alliance is a loose one and is oriented toward one very specific and only periodically highly visible threat, while the member social democracies face a host of others that are more immediately visible. Unlike the Warsaw Pact, all NATO members are fully sovereign nations and competitors in a neomercantilist world order (i.e., the close identification of national political and business interest on the international level)[2] and only secondarily capable of cooperation in the narrow field of military planning. Although there is ample room for improvement, defense procurement cannot be isolated and thoroughly rationalized in such an Alliance, where its implications for economic/technological development, employment, elections, divergent foreign policies, balance of payments in a world increasingly dependent on international trade, for better or for worse, predominate over defense related issues. The centralized control that makes the Warsaw Pact's armament efforts so rational

[2] A basic truth generally ignored by the U.S. government, unfortunately.

are those which stifle its economic and humanistic development. Hence, a fundamental conflict of Alliance and individual member interests severely constrains national policies in relation to persistent, if uneven, drives for international collaboration in defense procurement.

The increased exposure of European firms to competition from international trade and multinational corporations that followed the reduction of tariff barriers after the Treaty of Rome in 1957 and the Kennedy Round of GATT talks in the 60's forced most European nations to resort to other non-tariff instruments—totalling more than 850 types in one GATT study, and among which government procurement is one of the most significant in protecting/promoting national economic development. This exposure led to the supposed panacea of concentration through mergers of industries within each nation, with the national state-industry relationship moving toward a one-to-one correspondence and increasing particularism.

During the 1970's a series of destabilizing factors have hit the U.S. and the other industrialized social democratic nations, causing stagflation and transforming international trade. These have been:

- fiscal policies structured toward short-term expediency at the expense of long term social and economic health, i.e., a relentless suicidal policy of erecting one disincentive after another to capital formation;

- OPEC's quadrupling of the price of oil;

- inflation accompanied by divergent monetary and fiscal policies;

- floating, or more accurately, managed exchange rates;

- high unemployment;

- the invasion of manufactured products from developing nations as the usual production life cycle pattern in international trade manifests itself, as technology leads are eroded through the diffusion of technology throughout the world to the consumer nations. This has even begun to affect the lower technology ranges of the aerospace industry on the extra-European level and the lower and medium ranges for such nations as Greece, Italy, Spain, and Turkey;

- Japan's much lower production costs combined with it's difficulty in absorbing manufactured imports;

- economic and political rigidities within the industrial nations preventing a rational reallocation of resources necessary for growth, such as—the decrease in government perogatives vis-a-vis and concentrated industrial sectors, and slower growth and increasing social welfare costs (e.g., pollution control and work force stability) in the developed nations, and;

The above, interrelated factors have contributed to acute competitiveness/BOP problems for Western Europe, North America, and most other OECD member nations,

as well as an inability for national economies to reallocate resources rapidly enough, while insulating their economies (and politics) from serious destabilization.

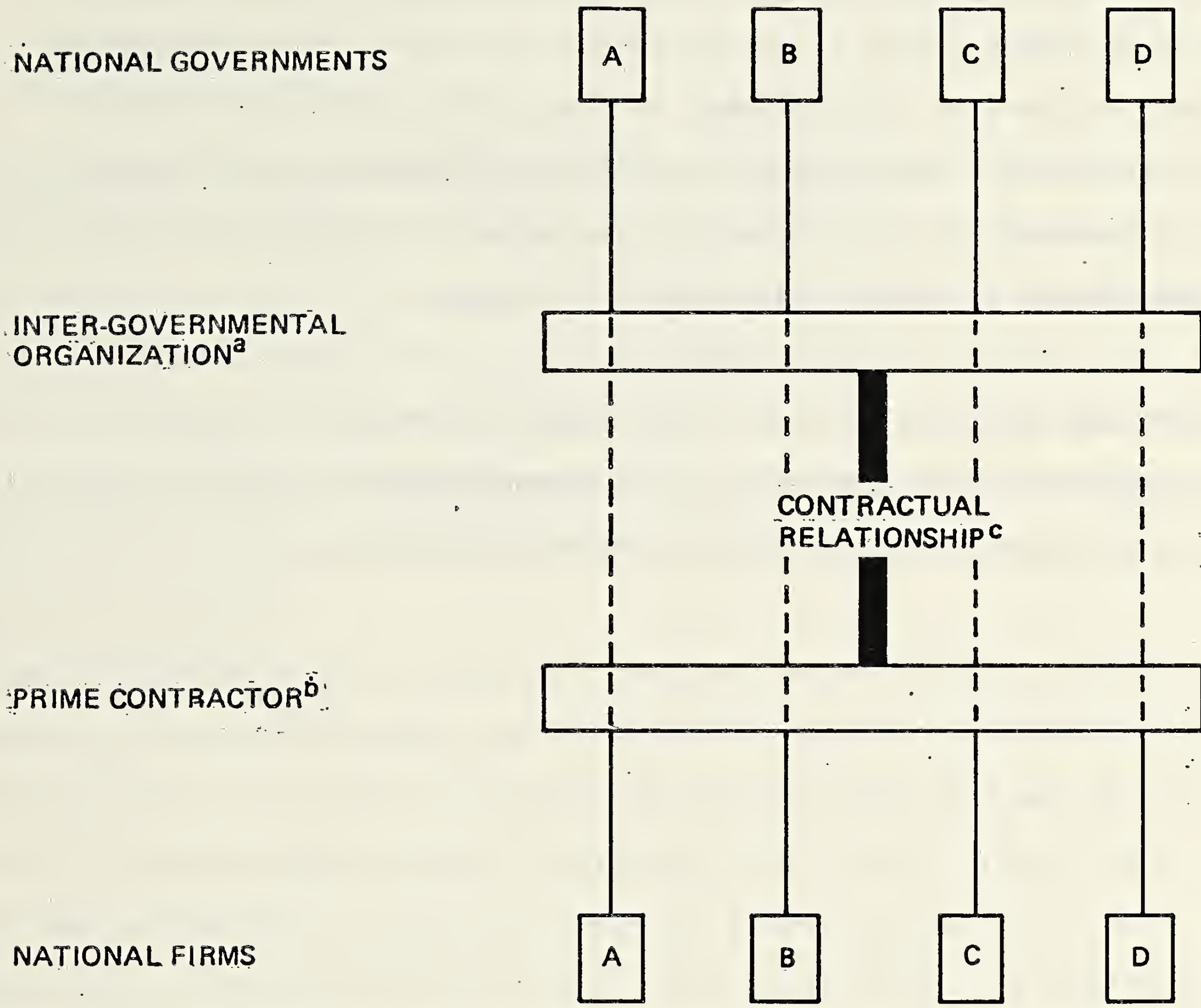
It is well understood that free trade—and the concomitant principle of comparative advantage—is a highly desirable goal, and rampant protectionism would result in a disastrous trade war. However, in order to remain upright in the surging international seas, nations have increasingly resorted to certain mechanisms of international trade, that avoid the worst, while lessening somewhat the openness of national economies and certain particularly sensitive economic sectors. This has included such arrangements as barter agreements and international cartels (e.g., organized marketing arrangements (OMA's), and the EEC's recently acquired cartel forming function), and the neomercantilism centered around the international competition of firms used as instruments of national policy (it being of little importance whether these national champions are publicly or privately owned).

Another example of this politicization of international commerce—one that both antedates the resurgence of international cartels and the appearance of national champions, while representing a synthesis of the two—is the subject to be studied in this paper. That is, the mushrooming of various arrangements among NATO allies for multinational collaboration in defense development and production, in lieu of single nation production and/or direct purchase of a given system. These have been extended beyond the standard licensing arrangements to include barter-like offset agreements and a particular sort of project by project joint venture involving not only a corsortia of producing firms, but

of their governments, as the buyers of the given system. This type of joint venture involves a dual consortium that is referred to as transnational enterprise, or a transnational venture. Transnational enterprise is peculiar to certain high technology industries, such as armaments, space, commercial jet transport, construction and energy. Although these arrangements all run counter to the worthy gospel of comparative advantage—especially among allies—they may be the most feasible defense of trade liberalism and a credible North Atlantic Alliance.

By definition consortia have limited life spans. Whether they be the dual consortia as represented by transnational enterprise or just industrial consortia, the dynamics involve constantly shifting coalitions, periodically forming consortia to design, develop and/or produce systems and then breaking up to reform again for a new project, with the same or another set of partners. Unlike the situation with multinational corporations, wherein technology, manpower and production assets located in a number of nations on a long term basis are owned by one firm and usually one based in a single country), here the imperatives of national defense (stemming both from national security requirements and the domestic politics of jobs and the funding of defense (i.e. non-productive capital goods) mean that each national industry remains autonomous. Geo politics and the fluidity of these design/producton teams, each contributing their individual assets, makes for a highly unstable environment.

These consortia are by no means exclusive to the NATO nations, but we do find the densest network there.



[a]This organization is either managed by the agency of one national government under the international supervision of a steering committee, or a NATO Production and Logisitics Organization (NPLO) is established. The NPLO includes an international board of directors for policy with an international management organization as its executive arm.

[b]One nation's firm will act as prime contractor, or an international prime contractor will be established under the law of one of the participating nations.

[c]The dotted lines represent the relationship between national governments and their industries. These relationships dilute and often tend to work at cross-purposes with the supposedly common buyer-seller contractual relationship (solid black bar).

Transnational Enterprise

For the U.S., gone are the days when coalitions to support defense programs were built between members of the two Houses of Congress, the current administration, the Pentagon, the individual services, American defense contractors and labor leaders. Nowadays, these coalitions have expanded to incldue all their coutnerparts in other allied nations, the result being a much more complicated process of weaving and maintaining a consensus.

The myth that defense acquisition can be separated from politics is now even less appropriate in the current U.S. defense contracting environment, given this strong inter-allied orientation since the mid-1970's.

C. Defense Collaboration Within an Alliance of Social Democratic Nations: The Challenge

A transnational venture involves the alignment of a consortium of procuring governments and its industrial counterpart, a consortium of contractors from the procuring nations. This buyer-seller relationship operates on two levels. One is the explicit contractual relationship between the two consortia. The other is the implicit relationship that closely aligns the individual national government with its own industry. Herein lies many of the constraints within which the parties must operate, and the potential conflict of interest.

Demands placed on the distribution of defense work by the alliance's social-democratic customer governments can be viewed as an expansion to the international level of their individual national policies using the placement of contracts and subcontracts to further social goals such as the steering of work to labor surplus areas, spreading work across a wider geographic base, and among small and disadvantaged businesses. These 'non-rational" socio-political demands (at least from a purely economic viewpoint) permeate government contracting. When such governments, themselves each being a complex and dynamic coalition representing a balance of numerous interests, band together for the procurement of a common weapon system, these same tendencies manifest themselves.

Defense procurement, as a primary component of government procurement and an important instrument of national economic development policies, therefore, often becomes a non-tariff trade barrier. Each of the allies defense procurement

Organizing the headquarters in Norway.
NATO PHOTO

Recce Squadron Ferrets meet a patrol
North Norway.
NATO PHOTO

environments are unique and may limit or foreclose the leverage of other governments or firms, in multinational collaborative programs.

Defense contracting generally is characterized by a very high degree of uncertainty vis-a-vis the development of any given system, as well as a highly structured and personalized relationship of mutual dependence between the contractor and the government. First the government is in a monopsony position, followed by the contractor being in a monopoly position, thus creating an unstable and highly artificial market environment. As a program evolves, this monopsony-monopoly cycle is repeated constantly. In Alliance armaments collaboration there must be compatibility of industry-to-industry, government-to-government and industries-to-governments within this highly unstable environment. A given project can be blocked by any one of the parties perception of self-interest, with each being faced with a higher than normal degree of risk due to greater exposure to the unilateral actions of any one of the foreign participants. The elements of this general problem involves the difficulty of aligning such differences as:

- military doctrines;

- geographically based requirements of a national, regional, or global orientation;

- aligning budgets and replacement schedules;

- defense, economic, and foreign policies;

- competition in domestic or export markets;

- the degree of dependence on, and the destination of exports, e.g., the percentage of exports to total sales for the U.S. is about 1/4 whereas it is around 1/2 for Great Britain and 2/3 for France and while the majority of U.S., French and Italian exports are extra NATO, the majority of the British and German exports are intra NATO;

- third country sales restrictions and the higher dependence of the European Aerospace industry on military exports;

- not invented here and other 'attitude' problems;

- nuclear and non-nuclear nations;

- the DoD's need for less vulnerable North American sources;

- difficulties of transnational subcontracting;

- state-industry relationships;

- intragovernmental relationships;

- industrial practices generally, such as standards, and the European emphasis on work force stability and its implications for skill levels multiple shifts, overtime, hiring and firing, and manufacturing technology;

- differing capital/labor ratios;

- armaments collaboration policies such as U.S. emphasis on interdependent R&D and the European emphasis on joint development and production[3];

- size and structure of the national market and industrial base (closely related to above); e.g., for the years 1973-1976 NATO Europe's defense budgets totalled only 54% of the U.S. defense budget, the U.S. commercial air transport market is almost 50% of the world market while the Western European markets total up to only about 25%, and the total 1976 turnover of the U.S. aerospace industry was 24.5 billion compared with 9.2 billion for all of Western Europe, i.e, 38% of the U.S. total;

- selection of contractors, e.g., competitive (U.S.) versus designated (European);

- national and industrial security;

- defense contracting practices including profit negotiations, financing, auditing, documentation, degree of government control of contractors (and vice versa), and the degree of detail in procurement regulations and system specifications;

---

[3]The family of weapons concept is a current attempt to synthesize these two tendencies. The interdependent R&D philosophy is heavily weighted toward minimizing costs. All R&D work is unilaterally funded and done by one nation, with the end product available to all others under a licensing agreement.

- the high visibility and resultant exposure to criticism of international collaborative programs.

The post-war economic trend within the EEC has been heavily weighted toward greater economic cooperation, as opposed to integration, this being especially true of the defense and aerospace industries. The outcome of the reduction of tariffs, only to be replaced with a panoply of non-tariff instruments, combined with the marginal results of mergers of firms within national industrial sectors, leaves little to recommend the feasibility of any brilliant new solutions of a common procurement agency, a common armaments market and/or the transnational merger of firms within Western Europe or NATO.

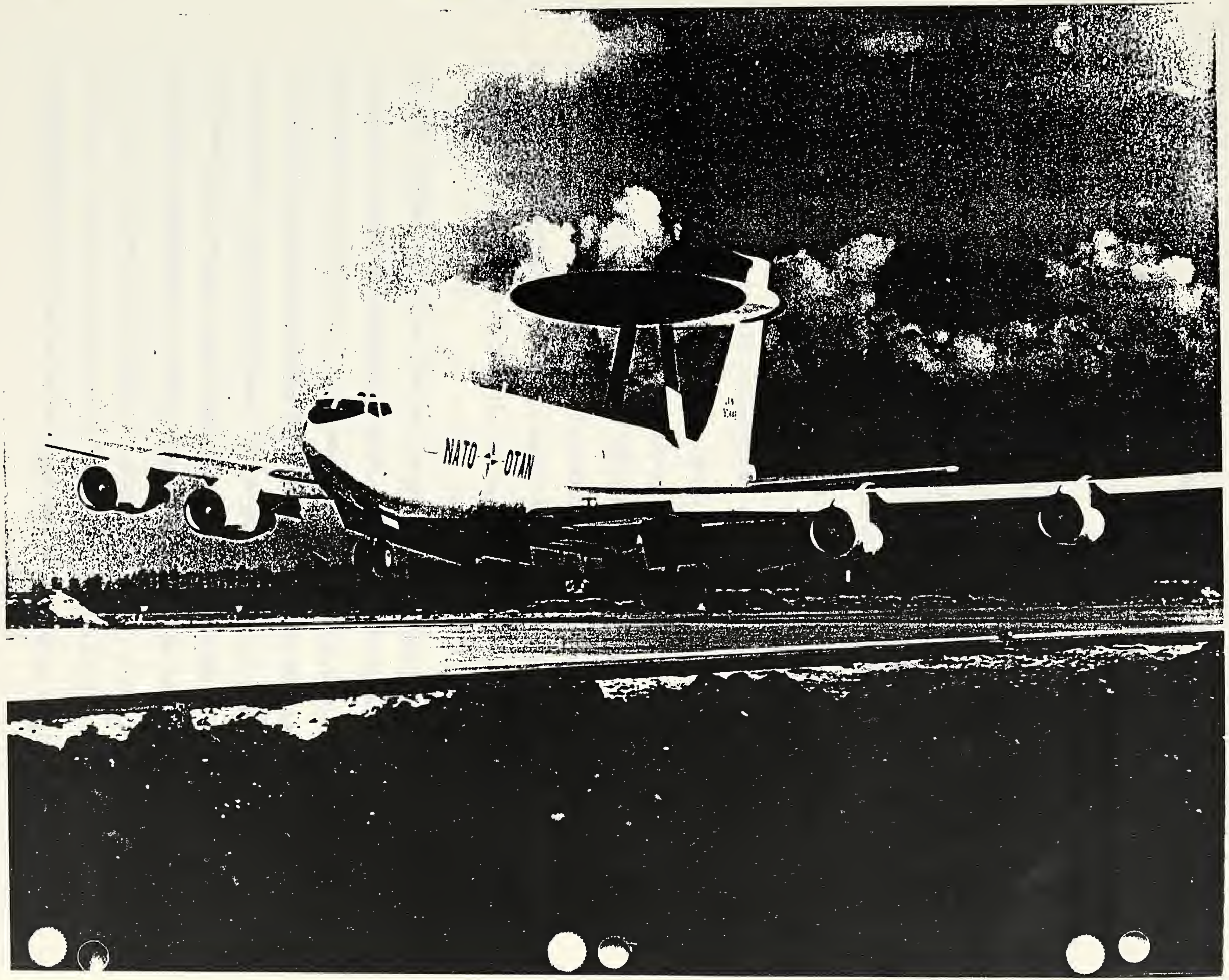
As an outcome of the cost-budget squeeze facing defense procurement in NATO nations, many major aerospace development and production programs have become collaborative in nature. As the U.S. aerospace industry's view of subcontracts shifted from one of avoidance during the early 50's toward one of its utilization as protection against increasing financial risk (e.g. in the face of the U.S. government policy of reducing its furnishing of plant and tooling to defense contractors, profit was not readjusted upwards to support major new capital investments), so too did they begin to favor teaming arrangements. As a natural evolution of subcontracting, leading aerospace firms began to team up for such projects in the late 60's as the F-111 (GD and Grumman), C-5A (Lockheed & General Dynamics), the 747 (Boeing, Northrop & Fairchild), the DC-10 (McDonnell & General Dynamics) and finally going transnational with the 767 in the late 70's (Boeing plus a grouping of Japanese and Italian firms).

On the European side of the Atlantic these teaming arrangements started up in the late 50's and often involved two or more firms from different nations as well as their respective governments. These international teams followed the principle of 'juste retour', involving proportional cost and work sharing in development and production among the fractionalized industries, each closely aligned with its national government. Even though these arrangements are somewhat unwieldly[4] they have provided a satisfactory solution for the European NATO members. As governments and industries are increasingly forced to collaborate, participants are gaining greater experience, and one can expect that the cost and delays involved will continue to come down.

This principle of 'juste retour' can be followed among groupings of 2 or more European nations, but once the U.S. enters the picture, either its proportionate share would involve it inevitably dominating the program—a situation which is usually unacceptable for the larger European nations—or cooperation on an equity basis would produce time and cost trade-offs which a world power such as the U.S. cannot always accept, as a regional power can.

[4]A formula in common use since the mid-70's placed the percentage cost and time increase over purely national projects on the order of the square root of the number of participants for cost, and the cube root of the number of participants for time.

Source: NATO Information Service



D. Conclusion

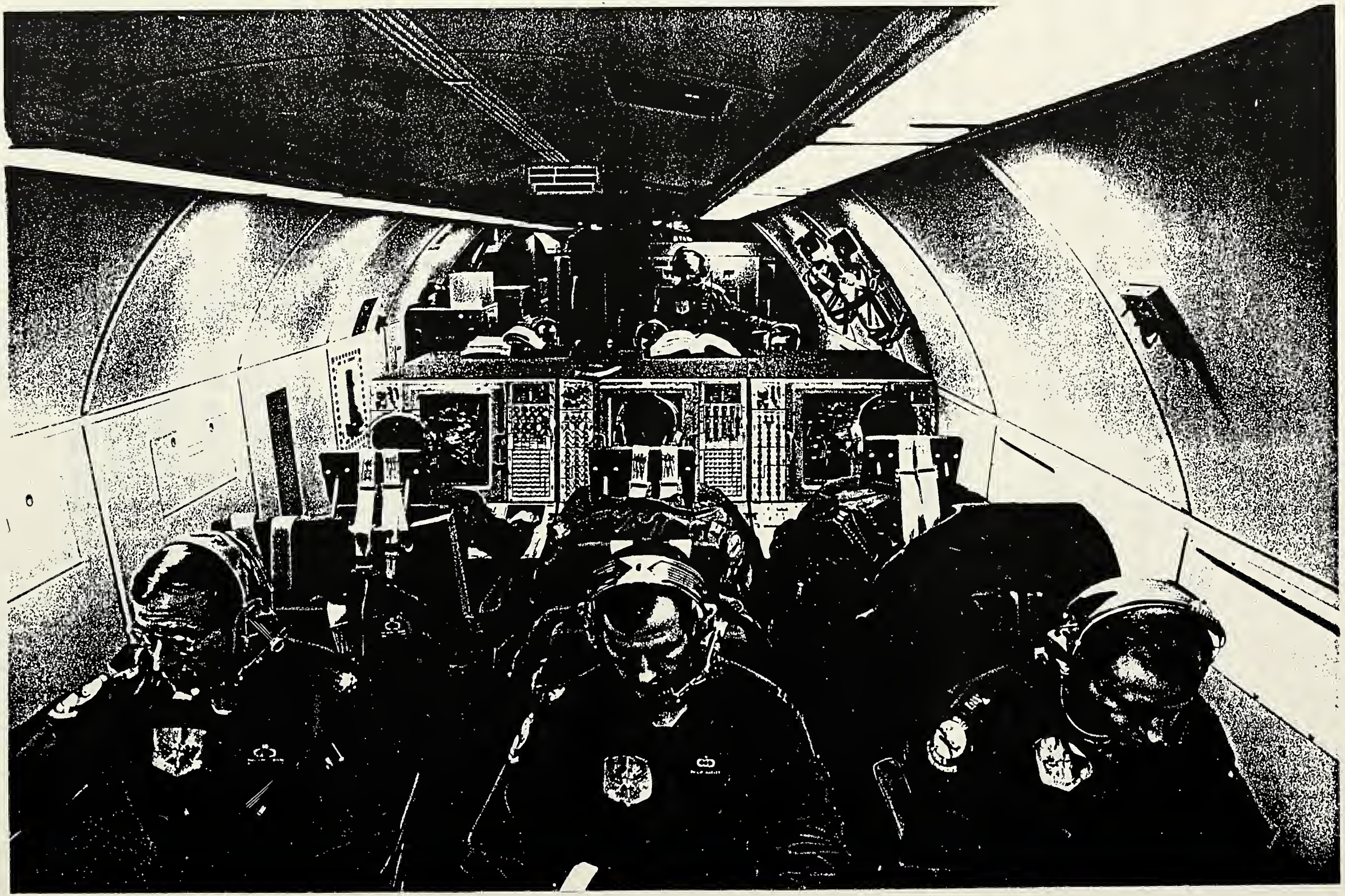
Consequently, the aforementioned obstacles to Alliance collaboration are not only numerous but are less easily surmounted across the Atlantic, than on the intra-European level. Granted, these can sometimes be overcome, and many good possibilities do slip by. However, even when circumstances permit and the U.S. government shows the political will to promote collaboration—through the U.S. providing benefits above those that any European nation could provide in technology, funding or market access, there is still a limit to how far this can go. As to the U.S. governments ability to use its considerable leverage over its own defense industry to bring about an improvement in NATO armaments standardization on terms acceptable to both U.S. and European interests, here too, there are practical limits, beyond which it would be counter-productive to venture. There is a real danger in aiming too high by overstating the case and by assuming 'political will' can surmount most of these obstacles, and resolve 2, 5, 30 or 80 years in the future, the non-rational use of Alliance resources. One must not ignore the fundamentals of an Alliance of sovereign states with widely divergent interests. When this has occurred in the past the aftermath has involved a swing of the pendulum, resulting in a discrediting of these worthy efforts throughout industry and government.

On the European side of the Atlantic there has been considerable industrial collaboration in defense procurement since the late 50's, which incidentally provides a feasible, if limited degree of standardization among the participating nations. It is highly doubtful, however, whether these collaborative programs can ever be carried out, in the near or distant future, on an alliance-

wide basis. Therefore, it is the author's belief that the allied nations, while increasingly being forced to collaborate, will continue to do so only in several ad hoc groupings. Even saving several billion dollars though, instead of 15 or so, is highly worthwhile. And while collaboration and standardization must continue to be actively pursued where at all feasible, for a long term solution the emphasis will have to fall heavily on interoperability as well, for any significant improvement in the operational effectiveness of NATO's forces.

Although the European defense industrial base is fragmented and much smaller (vis-a-vis the U.S. market), and is developing more along cooperative (e.g., consortia), as opposed to integrative lines (e.g., merger), it is important not to take a static view of the situation. If the processes of economic development are encountering obstacles, still they have not been checked in their flow. A 1977 study of Western Europe's aerospace industry by Euro Economics (an economic research organization of Eurofinance) concludes that, although collectively still much smaller than the U.S. industry—1976 European sales equaling 38% of U.S. sales must be compared with 19% in 1970 and 13% in 1960—it is not lagging behind in global competition or financial performance nearly to the extent that it is popularly felt. It states that the statistical record stands at odds with the generally pessimistic assessments, due to their focusing only on particular markets such as the commercial transport market, or isolated problem areas such as the need for greater coordination of national procurement policies. Since the study came out, even those two areas of concern have been affected by the purchase of Eastern Airlines of the A-300 and the record breaking export performance of 1977 for the French and U.K. aerospace industries, of

Source: NATO Information Service



around $5 and $2 billion, respectively for new export orders. In addition to its implications for NATO standardization efforts this development is also important for the present U.S. Administration's attempts to reduce foreign military sales. One must not ignore the total picture by focusing one's concern on the waste of Alliance resources, resulting from the underlying processes of national economic development.

In parallel with this continued development in Europe of the defense/aerospace industries, a new form of business organization and management has developed involving both business and government. This is centered around the entity previously referred to as the transnational venture. This new management art has grown out of the unique circumstances of Europe, and the cooperative, as opposed to integrative, lines that its economic evolution has taken.

Meanwhile, U.S. industry has been dealing primarily within one large integrated defense market. When U.S. firms venture outside of this national market it is for direct sales or as a licensor. In the post-Viet Nam era, the U.S. government became more aware of this evolution in Europe and has been moving over the last seven years toward bridging of the gap. This has and will continue to involve an increased participation of U.S. firms in the eight Modes of industrial collaboration covered in part 2 of this paper.

During World War II, for reasons of production capacity, passive air defense and assorted social objectives, U.S. defense firms were forced by government fiat to second source a great deal of their work load through licensing and/or subcon-tracting. Numerous problems were encountered in the process of learning

how to effectively transfer technology and manage subcontracts, two areas were prior U.S. aerospace activity had been minimal. Moreover, subcontracting in particular was generally perceived by industry to be not only more costly, but did not allow for as effective control and planning or rapid technical changes as in-house production. Reduction of in-house production was also viewed as increasing a firm's dependence on the vagaries of other companies. Second sourcing through licensing and subcontracting virtually died out with the end of WWII, but was revived when the Korean War began.

With the advent of the Cold War and the permanently expanded nature of the national defense efforts of the NATO member states there has been constant pressure from national industries and governments, periodically reinforced by drives at the alliance level, to further transform defense contracting within a U.S. dominated alliance. The tendency has been toward a more equitable, yet reasonably rational distribution of tasks within the North Atlantic Alliance, through an expansion of work sharing across national borders.

Over the last seven years the U.S. government and defense industry have been pushing to catch up with the European know-how acquired in operating in this new environment. The funding of this study has been part of Boeing's contribution to this effort.

Chapter 2

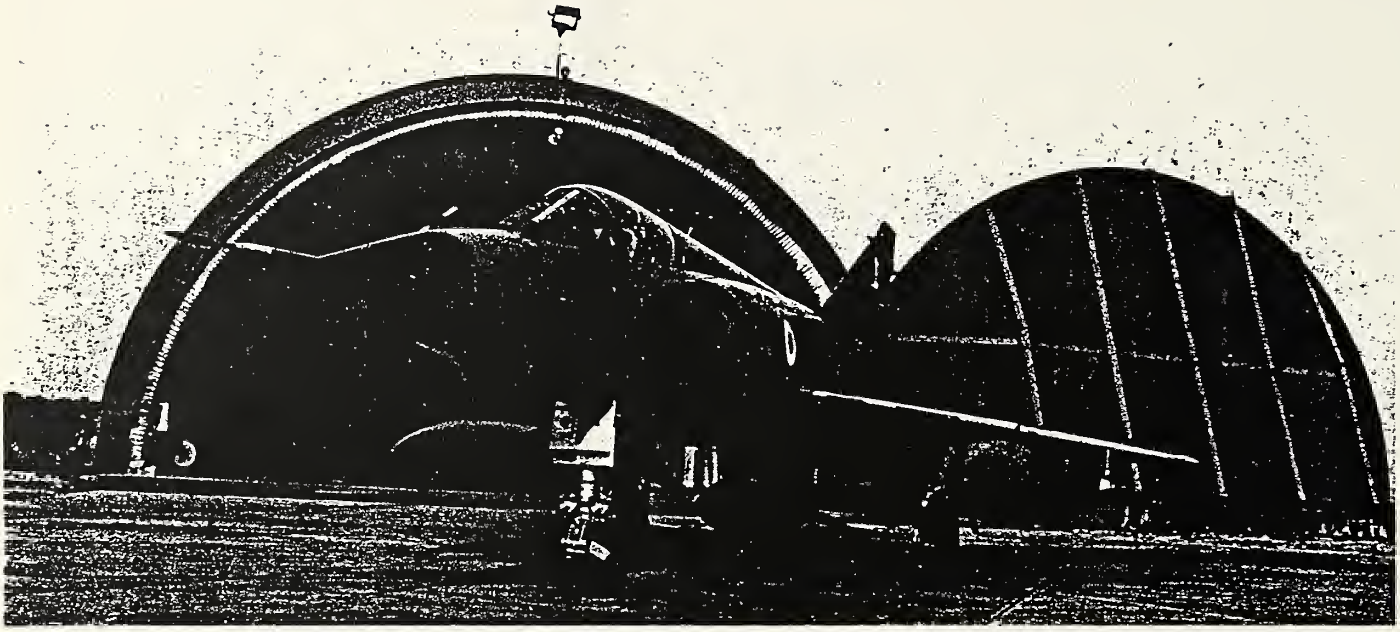
NATO INFRASTRUCTURE

A. THE NATO INFRASTRUCTURE PROGRAM

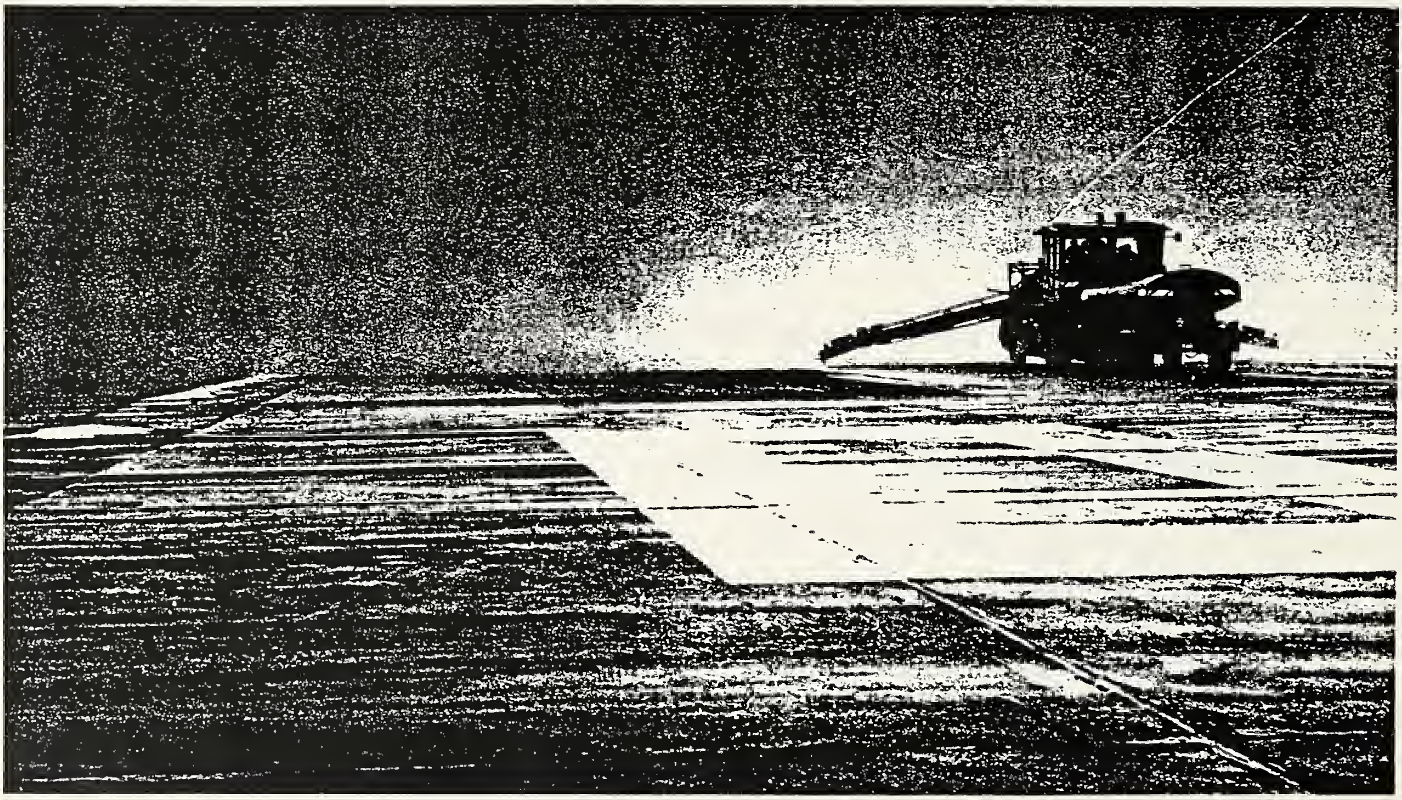
1. Definition

In the NATO context, infrastructure means those fixed military facilities, jointly used by two or more countries or having a high degree of common interest, and which are necessary for the deployment and operation of the allied forces. This includes the following project categories:[1]

- Airfields - essential operational facilities only;
- Airfield protection - includes shelters for tactical aircraft;
- Telecommunications installations - military communications, NATO-to-government and government-to-government communications, satellite communications;
- POL - pipelines and 30-day storage for jet fuel;
- Naval bases - POL, ammunition and other storage, repair facilities piers;
- Navigational aid stations - air and sea;
- Radar - early warning, air and sea;
- Training installations - tank, air, and missile ranges;
- War Headquarters - static and mobile for international Headquarters;
- Surface to Air Missile (SAM) sites, (i.e. NIKE and Hawk);
- Special Ammunition Storage (SAS) sites - storage sites for U.S. nuclear warheads that are to be made available to allied forces;[2]



Mirage III E équipé d'un CEN 52 d'entraînement (Sgc JP. Gauthier).



... "mise en œuvre immédiate avant que la situation soit irréversible, rigueur dans l'utilisation..."

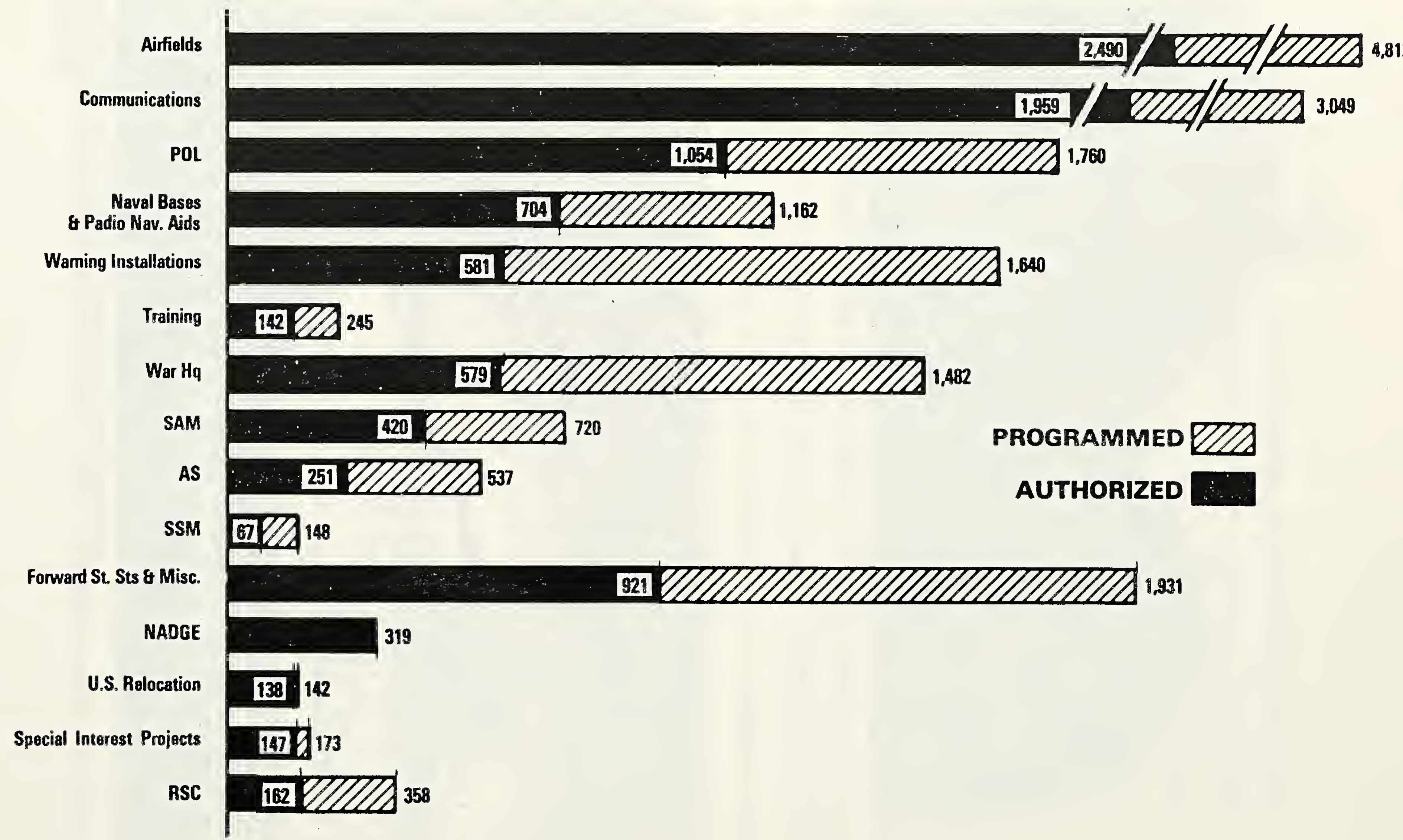
- Surface-to-surface Missile (SSM) sites, (i.e. MACE and Pershing);[3]
- NADGE - NATO Air Defense Ground Environment - integrated early warning, command and control;
- REINFORCEMENT SUPPORT - The most recent category, added in early 79, expanded from the case-by-case status to a new category covering equipment and ammunition storage, and facilities for dual based USAF units;[4]
- Other - case-by-case agreements, such as U.S. and Canadian relocation from France.

NATO infrastructure has also included certain mobile installations closely associated with the previously listed fixed installations. The amounts of funds programmed over NATO Infrastructure's 30 years (i.e., through 1979), totals $7.8 billion (in then-year dollars). These projects were jointly financed by all the NATO member states (except Iceland, while France has only participated in certain projects since 1966) through cost sharing formulas. They are managed on the basis of agreed rules, procedures and standards, while being implemented by host country agencies (i.e., the country in which the facilities are being constructed, or in special cases, by SHAPE, or NATO subsidiary agencies (NPLO's).

The term "infrastructure" was adopted from France, where it has long been used to denote all the work that need to be accomplished prior to the laying of a railway track such as embankments, bridges, tunnels, and other such structures that form the bed of a railroad. Infrastructure got its start in 1950 (Slice I) under Western European Union, which had been formed in 1948 with the signing of the Brussels Treaty by France, UK and the three Benelux countries.

INFRASTRUCTURE DISTRIBUTION BY CATEGORY, 1951-1984

PROGRAMS THROUGH SLICE 41 AND AUTHORIZATIONS THROUGH 31 DECEMBER 84
(IN $ MILLIONS)



Source: OASD(ISP)

This first Slice totalled some 32 million pounds sterling and was primarily for airfield and signals networks construction in France and the Netherlands, for use by the five Brussels Treaty Powers. The five nations agreed to commonly fund the capital investment for these fixed military facilities. NATO inherited this program, when, at the 1951 Ottawa meeting of the North Atlantic Council (NAC), NATO established its own common infrastructure program, commencing with Slice II. Within the broader framework of NATO, eligibile project categories were gradually increased from the original 2 to a total of 14.[5]

2. Three Decades of Cost Sharing

In the early 1950's, the program's emphasis was on aiding the economies and improving the hard currency resources of war-torn European NATO nations, while simultaneously providing for mutual participation in the construction of installations required for the defense of Western Europe. With Western Europe's economic recovery the emphasis shifted toward providing the complex integrated military systems necessary to support evolving strategy and military concepts.

For Slices II - IV NATO military authorities annually submitted Infrastructure programs to the North Atlantic Council (NAC) for approval, with a cost sharing formula having to be agreed to for each one. These formulae had to be devised through a trade off between the military and economic benefits of each project to the different participants plus another highly imprecise value, ability to pay. Therefore, in order to avoid over-frequent discussions on cost-sharing,

NATO adopted multi-year programs which would use a single cost-sharing formula involving rough cost estimates and an outline of projects to be implemented. The first of these programs was drawn up for three years, 1954 to 1956 (Slices V to VII), and the second for four years, 1957 to 1960, (Slices VIIb[6] to XI). Agreed programs for Slices II - VIIa totalled approximately 653 million pounds sterling ($1,828 million) and for Slices VIIb - XI approximately 304 million pounds sterling ($851 million).[7] The U.S. share of funding for Slices II - VIIa was 43.679%, but with the FRG's joining of NATO, was reduced to 36.98% for Slices VIIb - XI.[8]

In July 1960, a third program was approved for the four years Slices XII - XV (1961-1964) totalling 250 million pounds sterling ($700 million). For this program the U.S. share was reduced to 30.85%, again principally by an increase in the FRG's share.[9]

Negotiations for the cost-sharing formula for the five year program that would include Slices XVI - XX bogged down for nearly two years, the most controversial aspect being injected by the United States which during the early 60's had continued to push for the reduction of its share.[10]

Two distinct, but related issues were involved here. The U.S. services had actually been doing a better job of proposing eligible, or potentially eligible, projects for common funding - without inordinate allied opposition. The problem came however, in the negotiation of cost shares for 1965-69, McNamara having decreed a reduction of the U.S. share from 30.85 to 20%. The

TABLE OF COST SHARING FORMULAS
(PERCENTAGE)

SLICE	I	II-VII	VIII-XI	XII-XV	XVI-XXV	XXVI-XXX			XXXI-XXXV			36-41	
	COST SHARING APPROVED IN												
COUNTRY	1950	JUNE 1960*	FEB 1957	FEB 1961	JAN 1966**	SEP 1966***	14N***	15N**	SPEC PROJ***	14N***	15N***	14N****	15N
BELGIUM	13.18	5.462	4.39	4.24	4.61	5.30	5.5520	4.8215	5.5520	5.5912	4.8446	4.5912	3.9614
CANADA	–	6.021	6.15	5.15	5.48	6.31	6.3132	5.4825	6.3132	6.3578	5.5087	6.4251	5.5598
DENMARK	–	2.767	2.63	2.87	3.07	3.54	3.7012	3.2142	3.7012	3.7273	3.2296	3.7668	3.2596
FRANCE	45.46	15.041	11.87	12.00	13.16	–	–	13.1580	–	–	13.2200	–	13.3436
GERMANY	–	–	13.72	20.00	21.86	25.18	26.3585	22.8902	26.3585	26.5446	22.9996	26.7555	23.1597
GREECE	–	0.750	0.87	0.67	0.65	0.76	0.7932	0.6888	0.7932	0.7932	0.6888	0.7932	0.6888
ITALY	–	5.681	5.61	5.97	6.58	7.58	7.9313	6.8877	7.9313	7.9873	6.9206	8.0719	6.9848
LUXEMBOURG	0.45	0.155	0.17	0.17	0.18	0.20	0.2115	0.1837	0.2115	0.2130	0.1846	0.2153	0.1863
NETHERLANDS	13.64	3.889	3.51	3.83	4.23	4.87	5.1026	4.4312	5.1026	5.1386	4.4524	5.1930	4.4937
NORWAY	–	2.280	2.19	2.37	2.59	2.98	3.1197	2.7092	3.1197	3.1417	2.7222	3.1750	2.7475
PORTUGAL	–	0.146	0.28	0.28	0.30	0.35	0.3701	0.3214	0.3701	0.2011	0.2011	0.2032	0.2030
TURKEY	–	1.371	1.75	1.10	1.10	1.26	1.3238	1.1497	–	0.8045	0.8021	0.8130	0.8095
UNITED KINGDOM	27.27	12.758	9.88	10.50	10.42	12.00	11.9950	10.4167	11.9950	12.0797	10.4665	12.1757	10.5394
UNITED STATES	–	43.679	36.98	30.85	25.77	29.67	27.2279	23.6452	28.5517	27.4200	23.7583	27.8211	24.0629
TOTAL	100.000	100.00	100.00	100.00	100.00	100.00	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000

* THIS FORMULA REPLACES THE SHARES PREVIOUSLY APPLIED IN SLICES II, III, IVa, AND IVb TO VII.
** WITH FRANCE
*** WITHOUT FRANCE
**** FORMULA ACCORDING TO REDUCTION OF 1% TO BELGIUM.

Source: OASD(ISP)

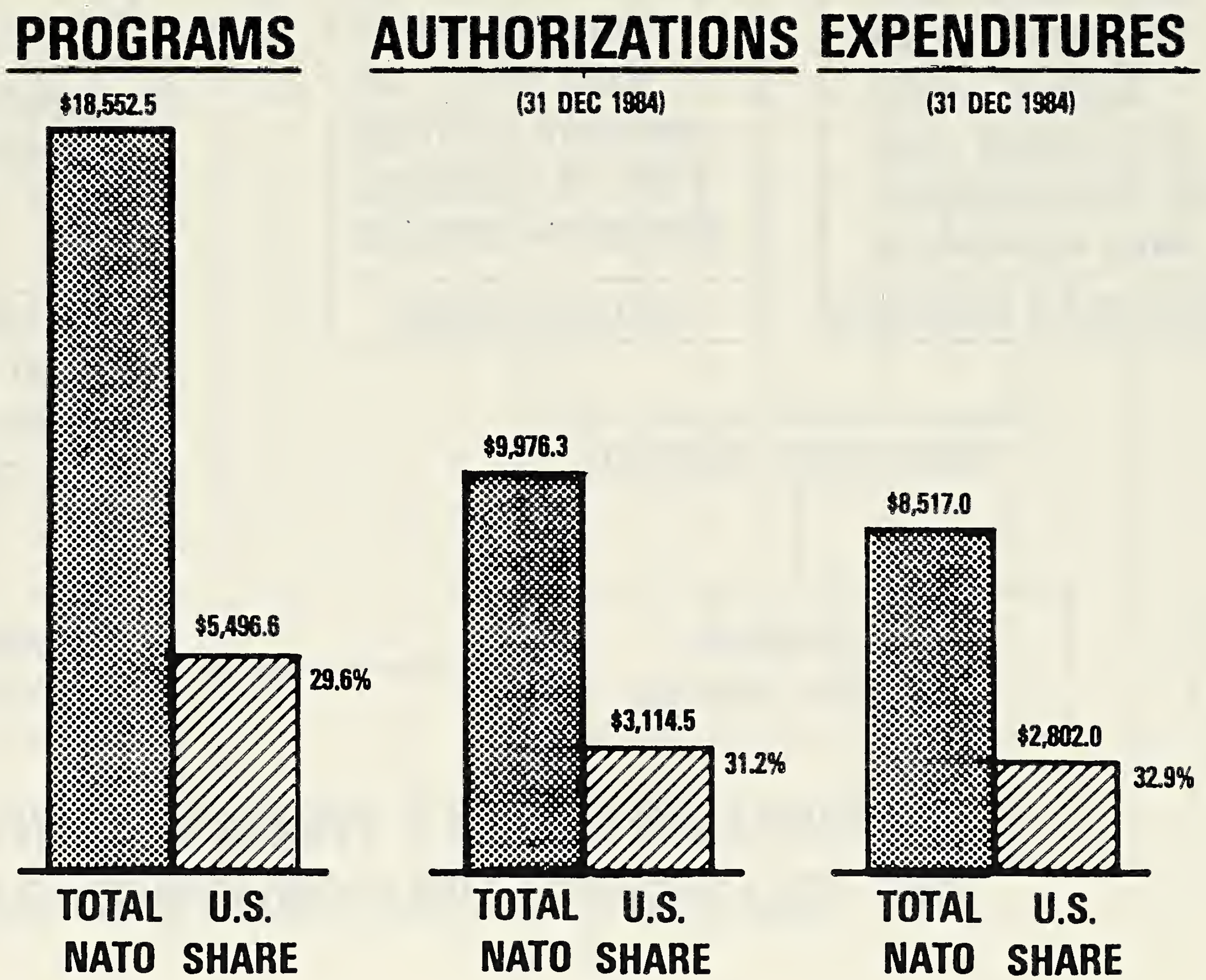
Germans had already reached the second contributory position and were not willing to take a disproportionate share of the U.S. reduction, while other nations resisted any substantive increase. The U.S. move was based on belief that NATO defense budgets should be more equally shared and that the common programs gave the allies an opportunity to offset the relatively larger U.S. defense efforts. The U.S. was insisting that "in the interest of equity and alleviation of the U.S. balance-of-payments deficit, facilities required by U.S. forces in NATO should be qualified to the maximum extent possible for infrastructure cost-shared funding in lieu of unilateral funding by the United States".[11] As the negotiations continued through 1965, a provisional program was approved to cover for that year alone until a more permanent arrangement could be worked out. In January 1966, the Member States finally agreed to finance a five-year program totalling 228 million pounds sterling ($635 million) for Slices XVI - XX (1965-69). The new U.S. share for Slices XVI -XX was to be 25.77%.

However, in September, 1966, the French Permanent Representative told the Council that his country would not in the future, take part in either the planning or the financing of the NATO Infrastructure Program. With respect to those Slices already agreed to - up to and including Slice XVII—France would only continue to pay her share for those projects for which it had already authorized funds. This involved primarily the NATO Air Defense Ground Environment (NADGE) program, which was then just getting underway.[12]

As a result of the French decision, the program for Slices XVI - XX had to be reduced by almost the whole of France's share which had originally been 30

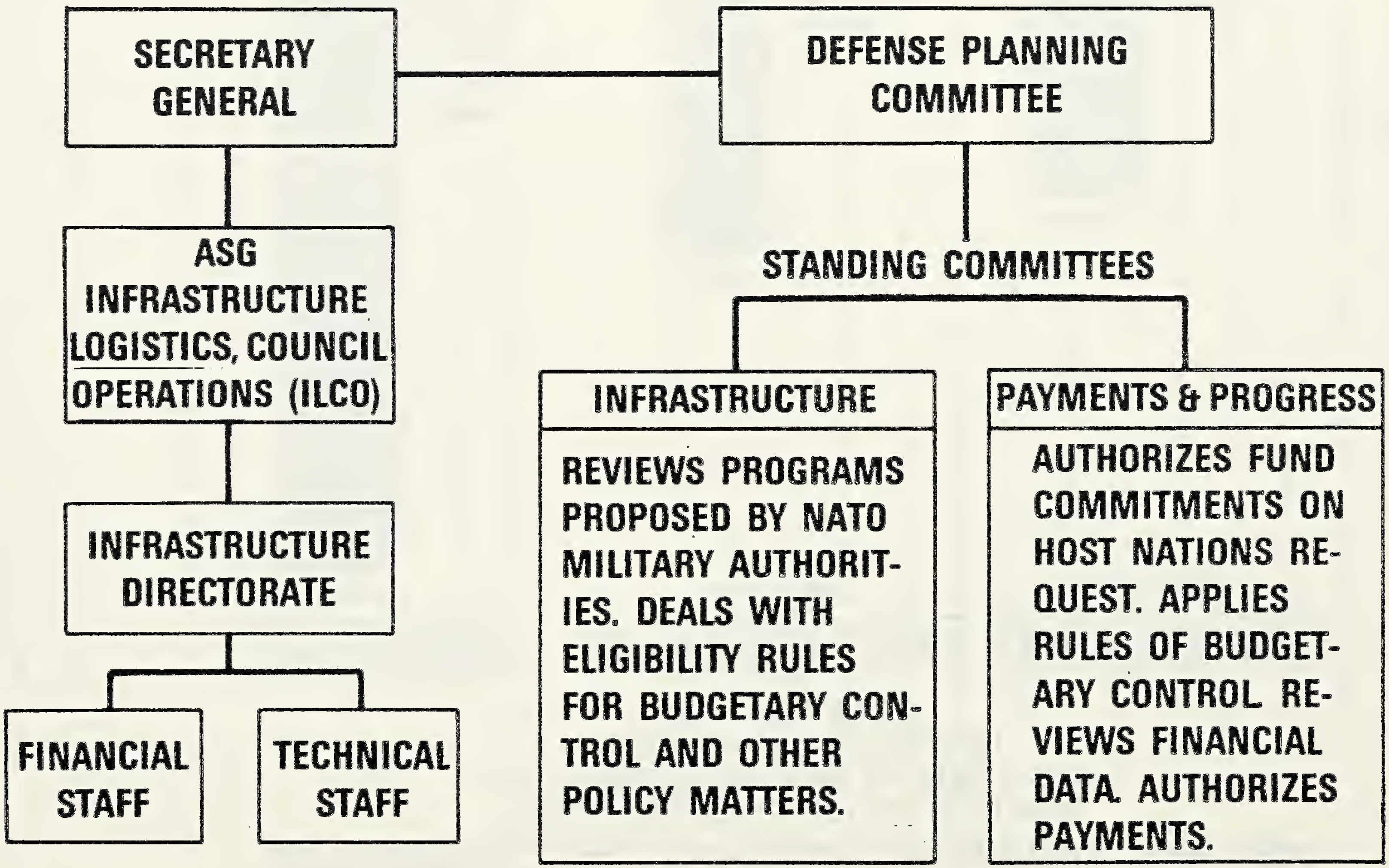
INFRASTRUCTURE FINANCIAL SUMMARY, 1951-1984

PROGRAMS THROUGH SLICE 41(1990)
AUTHORIZATIONS AND EXPENDITURES
THROUGH 31 DECEMBER 84
(IN $ MILLIONS)



Source: OASD(ISP)

NATO INFRASTRUCTRUE COMMITTEES AND INTERNATIONAL STAFF DIRECTORATE



Source: OASD(ISP)

million pounds sterling. This later meant that other national shares had to be increased for the remainder of Slices, XVI - XX. The same shares were approved in February, 1970, for the 1970-74 time span (XXI - XXV), with the new U.S. share standing at 29.6716%. In actuality though, the new U.S. share was reduced (in 1971-76) to a de facto share of about 20%, due to the IAU 150 million ($500 million) European Defense Improvement Program (EDIP) for financing the Aircraft Survival Measures (ASM) program[13]. The amount approved in 1970 for the five year program was originally IAU 250 million,[14] but since the funds previously approved were not sufficient to cover the needs of the last slice, an additional amount of IAU 55 million ($186 million) was agreed to by the Defense Planning Committee in December, 1973. In December, 1974, a new program of IAU 400 million ($1.35 billion) was approved to cover the needs of Slices XXVI-XXX, but funds were againexhausted before the last Slice and an additional IAU 140 million ($650 million) had to be provided, bringing it to a total of $2 billion for the most recent five year program (1975-79).[15]

For this program the U.S. sought to retain its de facto share of about 20%. For various reasons the U.S. share was formally set at 27.3%, but actually reduced to a de facto share of 21.56%. This lower share was achieved in an effort parallel to the Jackson-Nunn Burden Sharing exercise. NATO created for this purpose a United States Special Program which provided facilities for U.S. forces in categories not otherwise eligible for Infrastructure funding. This part of the program constituted a saving to U.S. appropriated funds and, therefore, the non-U.S. contribution could be counted as a reduction in the U.S. contribution to the normal Infrastructure program.[16]

The issues faced, and the compromises reached, during the negotiations for the most recent five-year program, 1980-85, involve yet another interesting example of multi-nation funding in this rather unique program.

The NATO member states have agreed to an IAU one billion program[17] to cover 1980-84 at the same cost sharing percentages which governed Slices XXVI-XXX, i.e., with a U.S. share of 27.23%. However, as always, the route followed was a rather tortuous one, and the eventual resolution involved the not uncommon recourse to postponement of dealing with outstanding issues.

When the member states originally approached the negotiations for the new period, they were presented with SHAPE's requirement for some IAU 1.5 billion for the five years. This was for what SHAPE called its most urgent priorities.

Shortly after publication of these requirements, the Long-Term Defense Plan (LTDP) was proposed by the US and accepted by NATO Ministers. This plan revealed requirements for another IAU 400 million in the next five years, principally for storage sites for prepositioning of materiel configured to unit sets (POMCUS) and facilities for colocated USAF units to allow for more rapid U.S. reinforcement of Europe, as well as other US commitments to the defense of the Alliance.[18]

Since the last previous program had totalled only IAU 540 million, the other members had difficulty digesting the more than tripling of that figure. The US, however, supported the requirement for IAU 1.5 billion based on the fact

that there was sufficient fat in the requirements to allow funding of the most urgent portions within IAU 1.5 billion. In addition, the negotiations were complicated by the fact that at least the FRG and perhaps several other nations were unhappy with the idea of another U.S. Special Program (USSP) which would reduce the effective U.S. share to well below that of the effective German share. It became necessary, therefore, to find a new plan to allow the U.S. to maintain something close to its previous effective share while also allowing European countries to sell their parliaments on a program which was certainly going to be considerably larger than the earlier ones.[19]

First of all, the member states got around the cost sharing problem by agreeing to a new category, called the Reinforcement Support Category (RSC), which would cover the new facilities required for the new U.S. commitments on prepositioning equipment, dual based air squadrons, and increased levels of ammunition supplies, reached within the framework of the LTDP, some of which were not then eligible for Infrastructure funding—it being doubtful that they could be made eligible within the coming five-year period. It was generally understood that this category would indeed require a fairly large percentage of the total funds made available if the U.S. were to make good on its commitment within the five-year period.[20]

As for the second part of the problem, that of the significant overall cost increase, figuring in inflation, U.S. calculations indicated the costs of the previous year's 540 million IAU's would increase to something like 800 million

IAU's. Therefore, whereas certain countries were claiming that a IAU 1.5 billion would triple the previous programs, the U.S. was convinced that, in real terms, it did not quite double the cost.[21]

In any event, several European countries insisted that NATO could not increase its implementation rate fast enough to usefully implement IAU 1.5 billion of work in this period. So the U.S. Secretary of Defense finally accepted in May, 1979, a lower ceiling at IAU 1.0 billion, but on the condition that SHAPE would be allowed to front-end load to the extent of IAU 300 million per year, and that the Ministers would review the implementation rate after three years to determine whether more funds were required during the period. In addition, the nations agreed to examine their implementation rates and to do what they could to increase them.[22]

There appears to be little doubt that additional funds will be required after the third year. As long as NATO and the member states can move fast enough on the implementation rates to show that they can digest more funds by building really urgent Infrastructure requirements for facilities in support of the Long-Term Defense Plan (LTDP) initiatives, there appears to be a good chance further funding can be attained.[23]

For Slices XXXI-XXXV (1980-85), France is only participating in the Air Defense category (i.e., the ACCS updating of NADGE) which comes to around 10% of the total Infrastructure for the next five years.

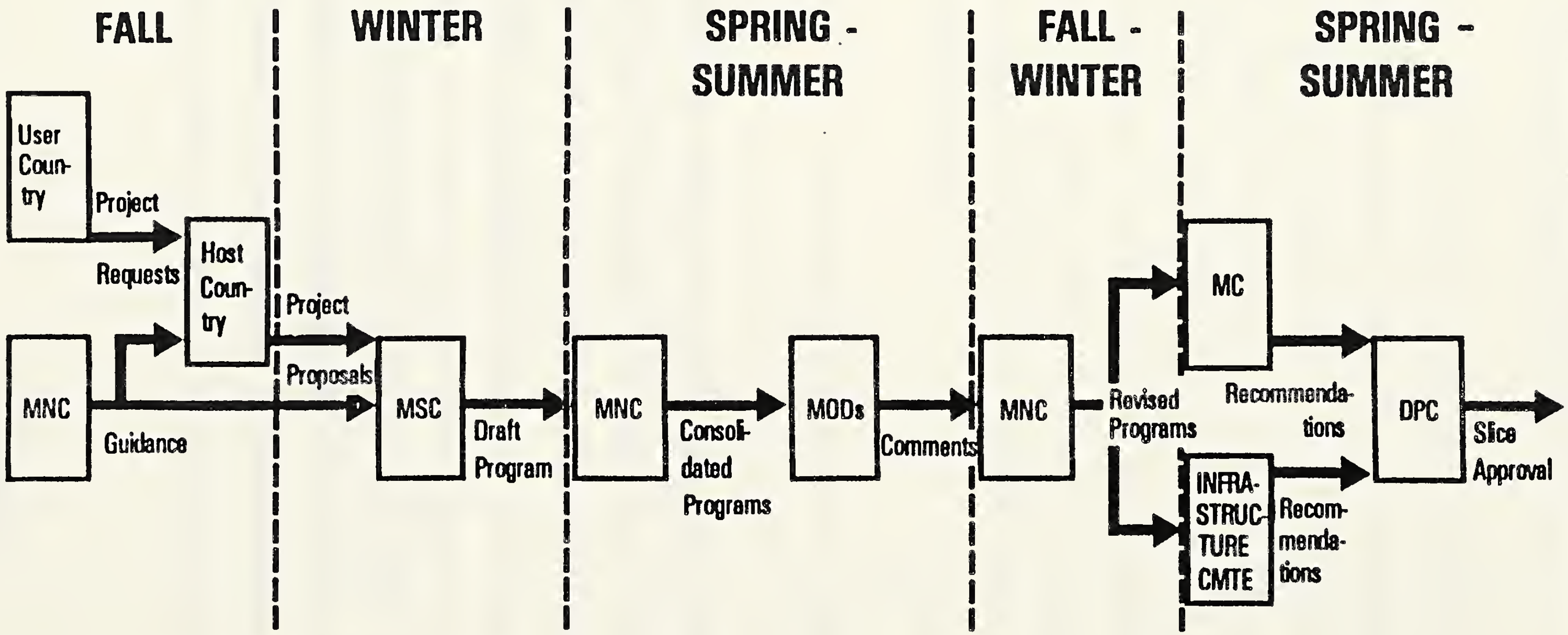
The following list gives the IAU values in terms of U.S. dollars as they have been periodically readjusted over time.

\$2.80	until	7 May 72
\$3.04	"	17 Oct. 73
\$3.38	"	30 June 75
\$3.90	"	31 Dec. 75
\$3.53	"	31 Dec. 76
\$3.59	"	30 June 77
\$3.738	"	31 Dec. 77
\$3.868	"	30 June 78
\$4.208	"	31 Dec. 78
\$4.449	"	30 June 79
\$4.574	"	31 Dec. 79[24]
\$4.721	"	31 Dec. 80

NATO neither holds nor administers funds allocated to the NATO Infrastructure Program. There being no common account, NATO's Infrastructure Directorate acts as a clearing house, keeping track of all transactions and the account of each country, reviewing the semi-annual forecasts of expenditures of all host countries, and then advising each Member State how much it owes to, or is owed by, each other Member State. The Member States then bilaterally enter into financial committments for the transfer of funds paying their contributions in advance on a quarterly basis for each stage of construction, as called for by the host countries. As the contracting authority, the host country, (again,

NATO INFRASTRUCTURE PROGRAMMING CYCLE

APPROXIMATE TIME REQUIRED TO DEVELOP AND PROGRAM EACH INFRASTRUCTURE ANNUAL SLICE PROGRAM



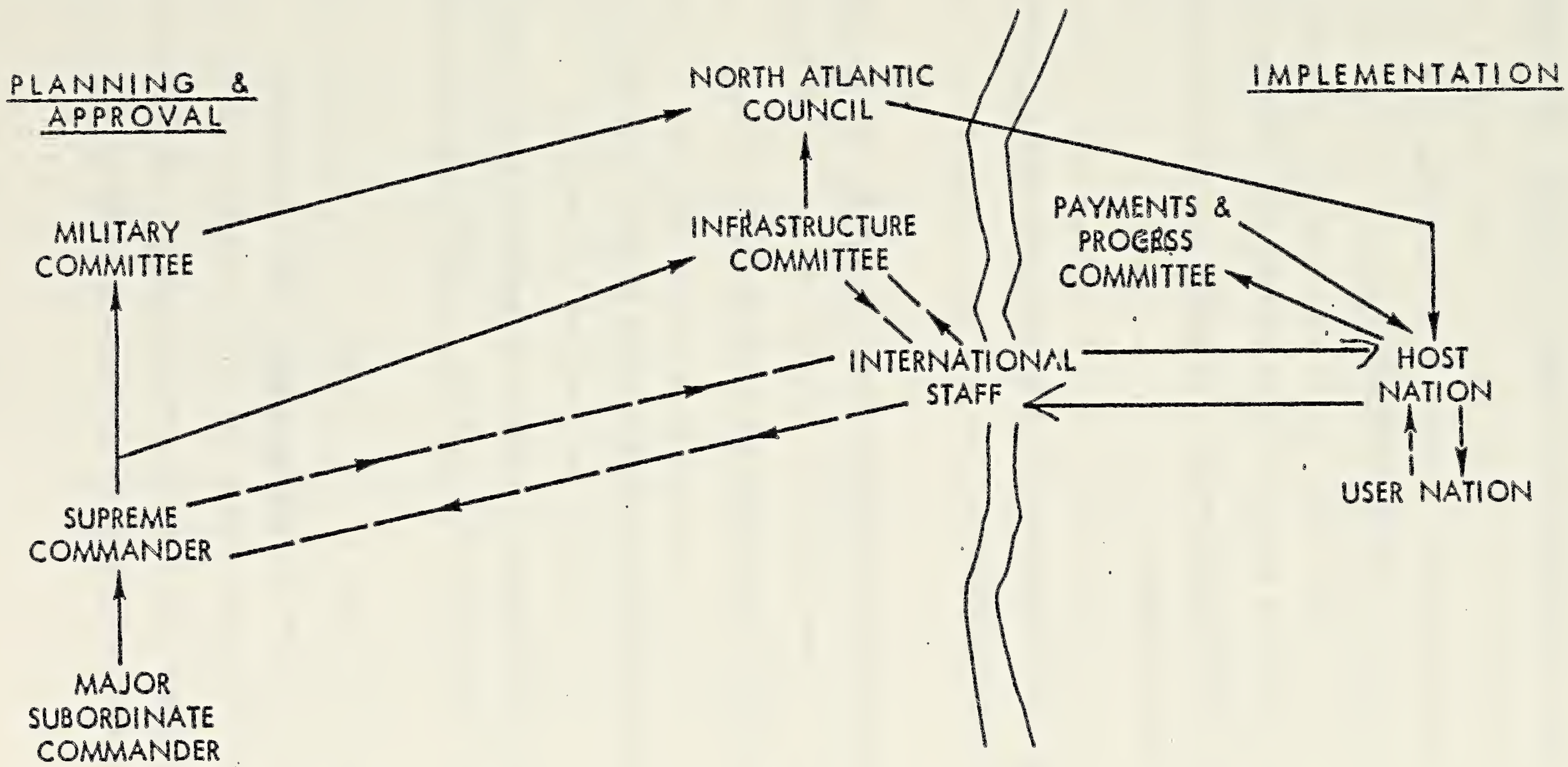
MNC - Major NATO Commanders (SACEUR, SACLANT)

MSC - Major Subordinate (to MNC) Commanders

MC - NATO Military Committee

DPC - Defense Planning Committee (NAC without France)

Source: OASD(ISA)



Source: Vandevanter

either a Member State, a Supreme Allied Command or an NPLO) then pays the contractors.

3. Planning and Approval

Infrastructure activities are readily divided between those dealing with planning and approval, and those dealing with implementation. Planning and approval involves the following:

(A) Host countries submit proposals for infrastructure projects to the Major Subordinate Commanders (MSC's).

(B) MSC's notify the Supreme Allied Commanders (SACEUR and SACLANT)—SACEUR or SHAPE accounts for about 90% of all expenditures and SACLANT (Norfolk, Virginia) accounts for the remaining 10% or so of the work.

(C) The Supreme Allied Commanders coordinate the requests from the MSC's, further refine them, and ensure that they are both essential to the support of allied forces and are suitable for common use (or at least a common interest), and of sufficient priority to compete for scarce funds.

(D) While preparing the annual slice the Supreme Allied Commanders consult with the experts of the International Staff (the Infrastructure Directorate of the Defense Support Division) to ensure that cost estimates are reasonable, the projects are technically sound, and that military requirements are being met at minimum cost to NATO.

(E) The Supreme Allied Commanders submit the proposed slices to the Ministries of Defense (MoD's) for review, and each MoD sends back its' comments and recommendations to the Supreme Allied Commanders some 2 months after receipt, following which the final recommended slice is submitted within the funding limits of the 5 year plan..

(F) The financial and technical aspects of the Supreme Allied Commanders' proposed infrastructure slice are critically examined by the Infrastructure Committee (one of NATO's 20-odd standing committees subordinate to the North Atlantic Council), again depending on the Assistance of the Inter-national Staff's Infrastructure Directorate.

(G) Simultaneously the proposed slice is examined by the Military Committee.

(H) The final reports of the Military Committee and the Infrastructure Committee are then submitted to the North Atlantic Council or Defense Planning Committee, being considered simultaneously for approval.[25]

Approval commits the Member States to the resulting financial contributions on the basis of the previously agreed percentages for the given five year program.

4. Implementation

Once a slice is approved, implementation begins. The Infrastructure Payments and Progress (P&P) Committee authorizes the expenditure of funds for specific

NATO INFRASTRUCTURE
IMPLEMENTATION AND BUDGETARY CONTROL

DPC	HOST NATION	P & P CMTE	HOST NATION	P & P CMTE	NATO BD OF AUDITORS
APPROVES PROGRAM (SLICE)	SUBMITS PLANS & COSTS FOR PROJECT	REVIEWS, APPROVES, FUNDS PROJECT	BUILDS	REVIEWS, ACCEPTS	AUDITS

DPC — DEFENSE PLANNING COMMITEE
P & P CMTE — PAYMENTS AND PROGRESS COMMITTEE

Source: OASD(ISA)

NATO INFRASTRUCTURE PROJECTS — CONSTRUCTION AND PAYMENT

HOST COUNTRY RESPONSIBLE FOR	*COSTS PAID BY
• PROVISION OF LAND	HOST
• PROVISION OF ACCESS ROADS	HOST
• PROVISION OF UTILITIES CONNECTIONS	HOST
• DESIGN AND PREPARATION OF SPECIFICATIONS AND COST ESTIMATES	NATO
• SUBMISSION OF PLANS TO NATO PAYMENTS AND PROGRESS COMMITTEE FOR APPROVAL AND FUND AUTHORIZATION	NATO
• CONSTRUCTION OF PROJECT AS AUTHORIZED AND TO REQUIRED STANDARDS	NATO
• SUBMISSION OF COST ACCOUNTING FOR NATO AUDIT	NATO

*Costs paid by host country are estimated to average about 13% of costs paid by NATO common funding.

Source: OASD(ISA)

projects. The host country assumes the entire responsibility for implementation of an individual project. The host country:

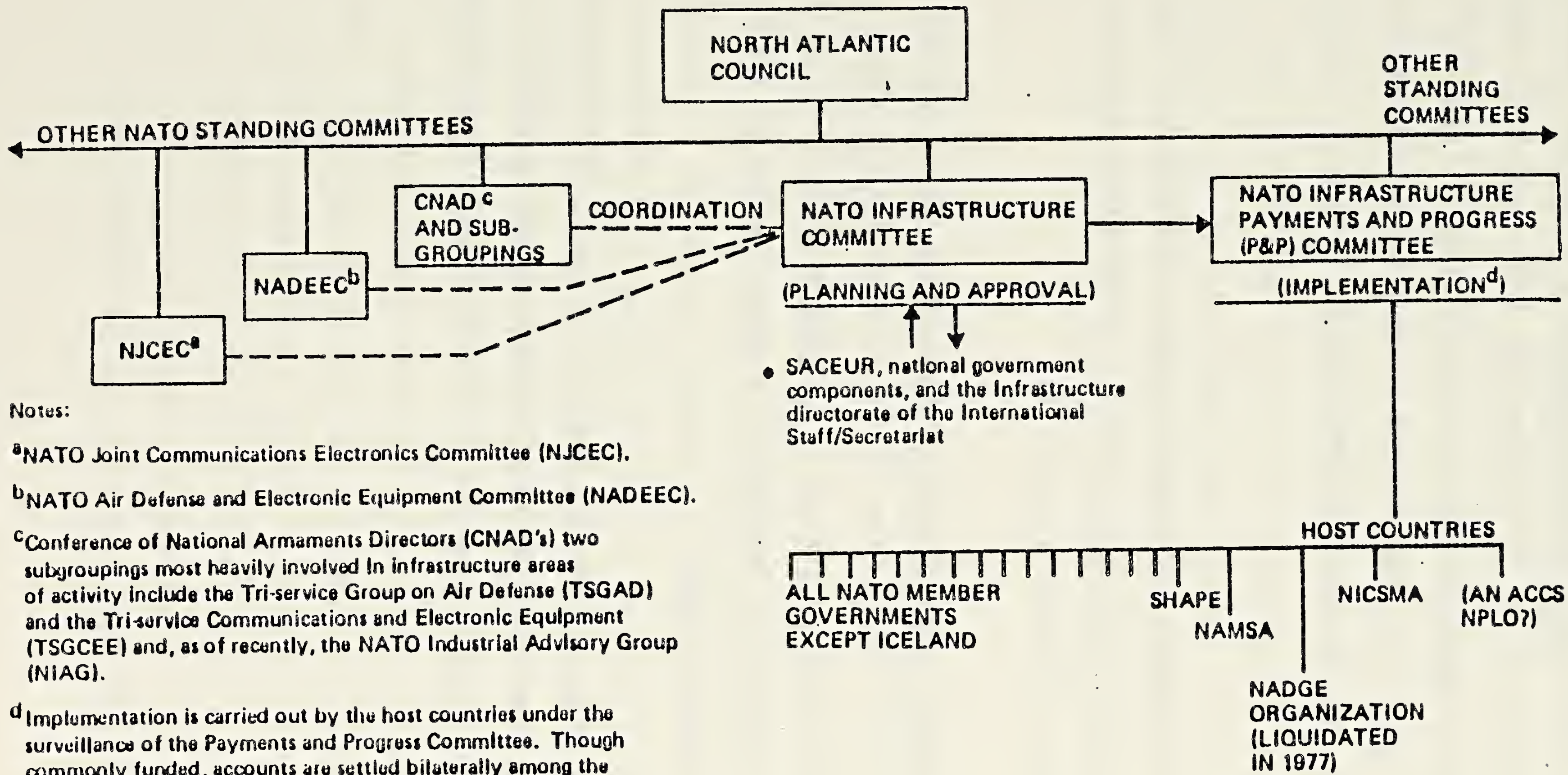
(1) Selects the sites where the facilities will be constructed, in consultation with the NATO military authorities.

(2) Draws up a plan which is then sent to the relevant Supreme Allied Commander and the International Staff for approval.

(3) After approval of the plan, prepare a detailed estimate of construction costs which must be approved by the P&P Committee.[26]

(4) With P&P Committee approval the host country then solicits bids for the contract from firms of participating member countries, under NATO's International Competitive Bidding (ICB) procedures,[28] and notifies national delegations of the opening and closing bid dates. Once the host country has selected the lowest bidder, signed the contract, and work is under way --experts of the International Staff as well as representatives of the Supreme Allied Commanders and of the user country, or countries, are available at the request of the host country, to make inspection visits to the site and report on progress of work.

Expenditure authority for all approved projects is in the hands of the Infrastructure Payments and Progress Committee (consisting of members the national delegations - in the U.S. case, the U.S. Mission). The P&P Committee receives technical assistance from experts of the International Staff's Infrastructure



Notes:

[a]NATO Joint Communications Electronics Committee (NJCEC).

[b]NATO Air Defense and Electronic Equipment Committee (NADEEC).

[c]Conference of National Armaments Directors (CNAD's) two subgroupings most heavily involved in infrastructure areas of activity include the Tri-service Group on Air Defense (TSGAD) and the Tri-service Communications and Electronic Equipment (TSGCEE) and, as of recently, the NATO Industrial Advisory Group (NIAG).

[d]Implementation is carried out by the host countries under the surveillance of the Payments and Progress Committee. Though commonly funded, accounts are settled bilaterally among the individual nations, being tracked by the International Staff/Secretariat. Prior to contract award, the host countries select the contractors through NATO's International Competitive Bidding Procedures (AC/4-D2261). Expenditure authority rests with the P&P Committee and audit authority with the NATO Board of Auditors. Actual contracting is carried out on the basis of the contracting authority's (i.e., the host country) standard practices (e.g., selection and wording of contract clauses).

Figure . NATO Infrastructure Program

Directorate. The P&P Committee's terms of reference include close examination of the estimates submitted by the host country and, where necessary, suggesting alternative and more economical methods of carrying out the work to the required specifications. These estimates are called "requests for authorization to commit funds" and constitute the basis for the amount due to host countries.

The P&P Committee also examines the financial reports submitted by the host countries and each quarter endorses the amount of contributions due to host countries by the other participating countries.

Upon completion, a project is inspected by a team consisting of representatives of the host country, user country or countries and the military authorities. The team, which is chaired by a member of the International Staff, inspects all the projects and draws up a report for the P&P Committee, recommending on acceptance by NATO.

Upon completion, the NATO International Board of Auditors, (IBA) responsible only to the NAC/DPC, examines the financial statements made by the host countries, thus ensuring the correctness of expenditures charged to NATO common funds.

5. Implementation Delays

As is to be expected, any cost overruns from delays and/or inflation, disputes or other complications--especially likely in the more complex and controversial projects--are handled between the host country and the contractor, with the NATO Infrastructure funds paying for any consequences thereof. Delays in the implementation of projects, further aggravated by inflation, have been a major cause of the depletion of funds that have resulted in a need to obtain additional funding, above the original ceilings, for the last two five-year programs.

a. New Procedures to Improve on the Speed of Implementation and the Correction of Deficiencies

Delays have been a continual headache for NATO Infrastructure projects, resulting during the early '60s in various measures to speed up the slow rate of implementation. In 1959 the Infrastructure Committee directed, in conjunction with the NATO military authorities and host countries, that increased attention be paid to methods for accelerating construction of facilities undertaken as part of the NATO Infrastructure Program.[29] First there was the Acceleration Program, stemming from delays in the construction of Special Ammunition Storage (SAS) sites and surface-to-air missile (SAM) sites. Investigation showed that the greatest delay between program approval and completion occurred in the FRG, from problems in land acquisition, and German administrative procedures that sometimes required as many as 100 separate actions before bids could be solicited. In order to eliminate delays the Acceleration program provided for on-site screening by SHAPE, the

International Staff, the user, and the host nations; advance funding approval for all SAS and SAM projects nominated by SHAPE for the procedure; and payment over the normal costs of the works (amounting to up to 15% extra) so as to complete them by the end of 1962. Under this program over 200 projects were implemented, most of which were terminated by the deadline, though a few dragged on till mid-1963.[30]

With the Acceleration Program successfully completed, SHAPE and the International Staff requested to the Infrastructure Committee that it preserve as much of the procedure as possible. The Infrastructure Committee agreed that, in the future for projects nominated by SHAPE, those accelerated procedures not adding to the cost of the project would be retained. This then became the Streamlining Procedure.

Then there was Operation Cleanup. Between 1961 and 1965 the U.S. had been reluctant to accept in the P&P Committee any joint final inspection reports of SAS and SAM facilities, due to its feeling that such acceptance would preclude expeditious correction of operational deficiencies, which were numerous, especially on sites built before the issuance of SHAPE criteria. On the other hand, host nations felt that detailed estimates and approved funding requests would be needed before they could be assured reimbursement for correction of deficiencies. However, for the large number of projects involved, the preparation of such estimates presented an enormous burden for the already overloaded user countries' construction administrative staffs. Finally, in March 1964, the U.S. requested that all deficiencies on already completed projects be corrected on a one-time basis, and that new rules apply from that point on.

The Infrastructure Committee agreed to this and set a three month deadline for reporting deficiencies. Then the United States, after an initial screening by the International Staff and SHAPE, presented to the Infrastructure Committee basic lists of urgently needed items to permit the completion of facilities. The Infrastructure Committee accepted them in February, 1965. Under the agreement the host countries were to correct the deficiencies approved on each site by SHAPE and the International Staff, and present the bills for payment upon completion of the work. The program got underway in Mid-1965 with all SAS and SAM sites to be fully operational within a year.[31]

b. Impact of Delays on Funding and New Procedures

More recently, NATO agreed (and once again in response to a U.S. initiative) to the adoption of Automatic Deletion Procedures so as to reduce the backlog of infrastructure projects. This backlog consists of all projects in previously approved annual slices that have not yet been authorized by the P&P Committee for actual construction. These procedures were required because inflation had rendered available Infrastructure funds insufficient to pay for all those projects programmed in earlier years. These new procedures were approved in 1971, and apply to Slice XXI and all subsequent slices. Similar procedures were also developed for application to slices prior to Slice XXI, and as of Winter 1977, NATO had virtually closed out all programs in these slices. The other allies endorsed the U.S. position that new funds would not be added to programs in old Infrastructure slices. Thus, projects must compete for available programmed funds within each slice group, or drop out of the program when funds allocated for that period are gone. As a part of this, agreement was reached on an attempt to limit to about 2½ years the period

between programming of a project and its implementation (again, applying from Slice XXI on).[32]

6. Prefinancing

An exception to ordinary NATO Infrastructure financing procedures is to be found in the prefinancing with national funds by a user nation of projects that were originally either ineligible, or urgently needed and not able to await approval through the usual procedures. For prefinancing, the user and host countries prepare a prefinancing statement explaining the military urgency of the project, and requesting the P&P Committee to reserve the right of the host country to request the inclusion of the project in a subsequent slice. Once the P&P Committee has 'noted' the statement, construction can proceed. This allows for its inclusion in a proposed annual slice, but does not guarantee that the project will be approved. Except for this deviation all other common funding procedures must be followed (e.g., the NATO Infrastructure Directorates review of design drawings, specifications, cost estimates, and inspection of progress and completion of the project; and the International Board of Auditors' final examination). If the host country succeeds in being reimbursed it then transfers the funds to the user country who originally funded it. Sometimes prefinanced projects can obtain reimbursement at a later date even when they don't originally meet NATO criteria, through a later expansion of criteria (as was the case with the U.S. aircraft shelter projects). Between 1969 and 1973 some $311.7 million in projects had been prefinanced by the U.S., and as of June 1973, $123 million had been recouped, with another $41.9 million awaiting NATO approval or in the process

of recoupment—the rest having been declared ineligible or not yet of sufficient urgency to warrant application of scarce funds.[33]

7. Operation and Maintenance

Infrastructure funding covers only capital costs. Once constructed, a facility must be operated and maintained by other means. Under the normal NATO formula the responsibility for the continued functioning of a particular item of community property (e.g., an airfield) devolves primarily to the host country, who then makes the necessary bilateral arrangements for funding with the user country or countries (except, of course, when the host country is also acting as the user country). No NATO project is built until the ultimate user country or countries have been determined and have signified a readiness to assume responsibility of operation and maintenance.[34]

The vast majority of cases involving funding of O&M costs involves a single user—which is either the host country or not, as the case may be. In the FRG, it is more often not the host country that acts as user, while it is generally the opposite elsewhere. And the few cases of two or more users sharing costs are mostly maritime facilities or training facilities.

This basic policy of the host assuming responsibility for reaching arrangements with the user nation or nations for paying for the operation and maintenance expenses after facilities have been constructed, sometimes involves a variation that introduces alliance-wide funding. This results principally

from two factors. On the one hand, some of the nations have a very heavy share of those installations constructed through common funding located in their territory.

On the other hand, certain facilities have a high degree of common interest and therefore most or all of the member states are users, or at least derive a more direct common benefit from it than normal. Hence, the need arises for the common funding of the operation and maintenance of certain facilities.[35]

The financing of these corporate activities is administered under what are known as the "Military Budget" and the "Civil Budget." Both the authorization of programs and the approval of expenditures, in their respective areas, are handled by the Civil Budget Committee and the Military Budget Committee. As of 1978 they collectively came to around 1/4 of a billion dollars annually.

The Civil Budget is the smaller of these two (and of little significance to the present subject), amounting to some $45-50 million dollars annually as of the late '70's. The Civil Budget covers the operating costs of the NATO Civil Headquarters in Brussels—its 1200 civil servants and the upkeep of the building. One new addition of interest in the latter half of the '70's to the Civil Budget has been the NATO Industrial Advisory Group (NIAG) prefeasibility studies con-tracted to industry which amounted to around 1/2 to 2/3 million dollars each (15 million Belgian francs).[36]

The Military Budget amounts to some 300 million annually in 1980 and includes, among others, the following agencies falling under the NATO's military aegis:

SHAPE;

SACLANT;

approximately two dozen subordinate headquarters of SHAPE and SACLANT;

the Military Agency for Standardization;

the NATO Defense College;

the Advisory Group on Aeronautical Research and Development (AGARD);

the La Spezia Anti-submarine Warfare Center;

the SHAPE Technical Center at The Hague, and;

the Latina Electronics School.

In addition, there are several major communications, command, control, and early warning systems such as:[37]

ACE-High;

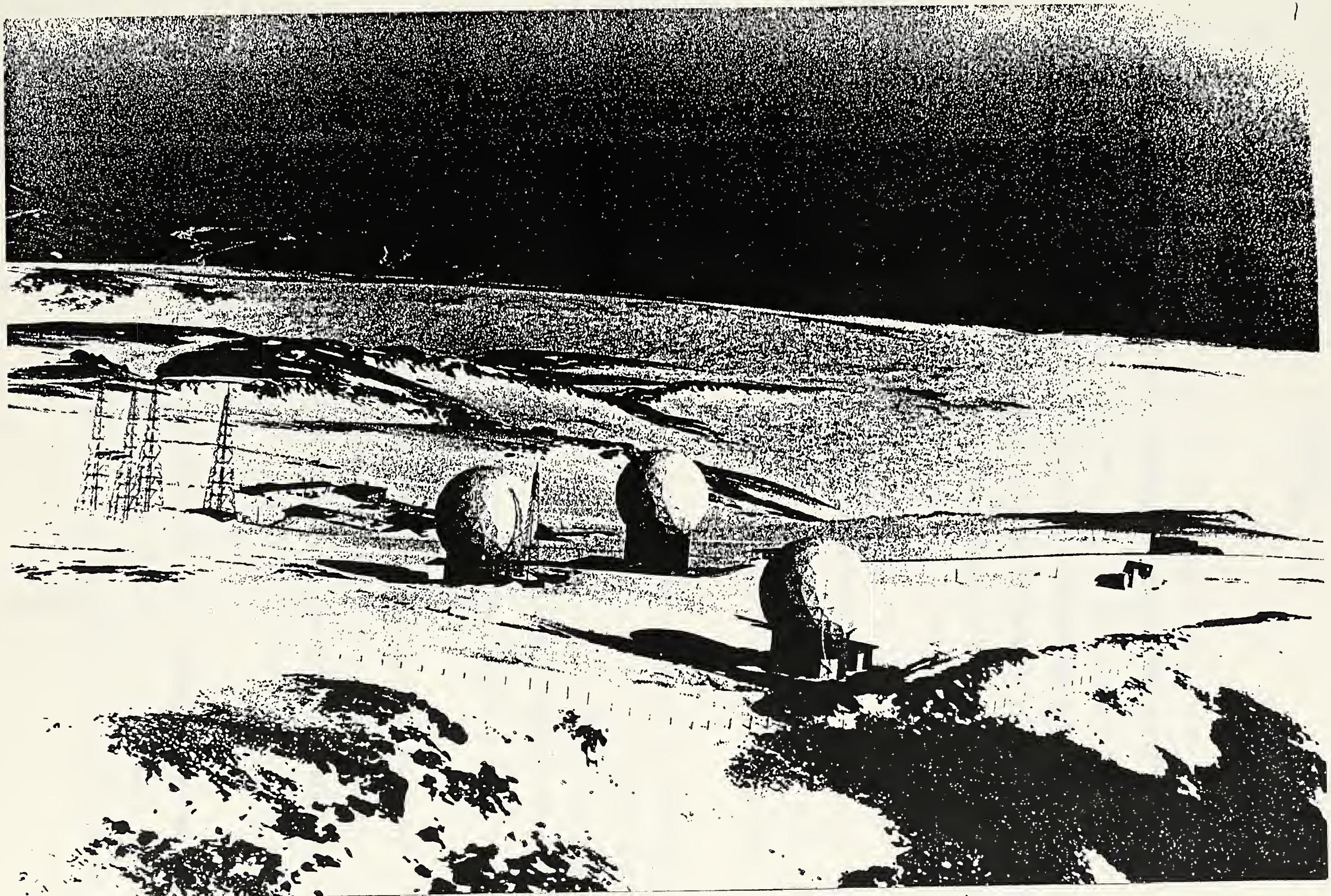
SATCOM ground stations;

NATO-Wide;[38]

Early Warning Stations;

NADGE, and, soon to be added; the NATO AEW&C program's E-3A Sentry Aircraft.

This latter category involves varying degrees of coverage by the Military Budget; for example: only 17 of the Early Warning stations; all of the ACE-High sites; and all of the NADGE system and SATCOM Ground Stations, except for personnel costs. The final arrangements for the operation and maintenance of the 18 Sentry aircraft have yet to be hammered out, as of the time of this writing.



Source: NATO Information Service

NADGE Site in Turkey

Another facility constructed through NATO Infrastructure funding that counts a fair number of the allied nations among its users, but whose operation and maintenance costs are not covered collectively by the Military Budget, instead being covered by the ad hoc group of users, is The NATO Missile Firing Installation (NAMFI) on the island of Crete.

Funding for the operation and maintenance of the 17 Early Warning stations and the ACE-High, SATCOM and NADGE systems is initially undertaken by the host country in whose territory they are located, being annually reimbursed by the Military Budget. For the C^3 and Early Warning/Air Defense systems, since the late '60's the policy has been to no longer assume personnel costs, and therefore the $11 million that the Military Budget covers for the NADGE system does not include these. However, NATO's Military Budget is still saddled with personnel costs for the Early Warning and ACE-High sites.

The Military Budget's rise from around $10 million in 1951 to $60 million in 1965, $81 in 1967, and $300 million by 1980 is primarily the result of the expansion in the scope of the facilities funded by the NATO Infrastructure Program. Other factors contributing to this rise include, naturally enough, inflation and the related devaluation of the dollar (to about 2/3 of its earlier value) against most major European currencies, as well as such things as the increased activity of the NATO headquarters (particularly in combined exercises).

The cost sharing formula for the Civil and Military Budgets has involved a considerable difference in the distribution of the burden in comparison to

Infrastructure. The U.S. share of the Civil Budget (in which France fully participates) is 24.2%. The U.S. share of the Military Budget is presently 25% for that 40% in which France participates as well, and 30% for the remaining 60% in which France does not participate. Thus, the U.S. comes out with an overall Military Budget share of around 28%.[39]

The U.S. share of the Military Budget has generally fluctuated over time less than has the U.S. share of NATO Infrastructure Program funding, thus allowing for a considerable variation between the two formulae. In 1959 it was 24.20% while the U.S. share of Infrastructure funding was 36.98%. Conversely, the U.K.'s shares were 19.50% and 9.88%, respectively, and France's 17.10% and 11.8%.[40]

As might be expected, these variances have caused nations to take different views on the content of the Military Budget and Infrastructure Program, especially since there is somewhat of a gray area between these generally distinctive activities. Back in 1957 the Allies found themselves unable to agree on a new four year cost-sharing schedule for the Military Budget, primarily because some countries claimed the projected undertakings were better suited for Infrastructure financing, then for budgeting as operating expenses (as they were primarily capital expenses). Concensus was eventually reached through resorting to a complex split formula under which expenditures up to an agreed ceiling would be paid under the Military Budget schedule, but any amounts above that would be apportioned according to Infrastructure quotas, shifting the weight of the funding effort. This resulted in a substantial excess charge to the U.S. The U.S. representatives, therefore, were

satisfied with a slight increase of their share from 24.2 to 25 percent for the 1966 reapportionment, since abolition of the split-ceiling provision would allow the U.S. to pay less over the long run.[41]

In any case, shortly thereafter, with French withdrawal from its participation in 60% of the activities supported by the Military Budget, the effective U.S. share moved up to 28%.[42] Most of France's participation was for supporting her interest in the NATO Air Defense Ground Environment (NADGE) systems; which could possibly eventually also lead to some sort of connection with the NATO AEW&C program.[43]

B. NATO Infrastructure Contracting

The NATO Infrastructure Program involves a unique form of decentralized yet common defense procurement within a quasi-common market in which, as of 1980, close to one billion dollars a year in contracts is let. This market is open to the firms of the 13 funding nations, i.e., all NATO members except Iceland (who has no armed forces and in terms of population and GNP is the smallest member of the Alliance) and France (who participates on only an occasional basis, and therefore French firms are only occasionally involved since 1967).

NATO procures through host countries that, though originally just the Member States, have expanded to include SHAPE, NICSMA and in a minor capacity NADGEMO, and NAMSA. The national governments receive a standard 5% administrative fee when contracting for NATO's Infrastructure program. In addition, these same host countries also provide for—at no cost to the NATO's Infrastructure fund— acquisition of land, access roads and utility connections. These services are estimated to average about 13% of costs paid by the common fund.

1. Ownership

Ownership is a rather fuzzy concept in the NATO Infrastructure Program. At one end of the spectrum in NATO there are weapon systems, that even when developed or produced through the collective effort of multinational consortia, become the exclusive property of each individual procuring nation. At the

other end of the spectrum lies common ownership which has been confined to several headquarters and those communications networks acquired by SHAPE, and more recently by NICSMA, through Infrastructure funding. The acquisition by the NATO Airborne Early Warning and Control Program Management Office (NAPMO) of 18 Boeing E-3A Sentry aircraft will be another major expansion in the list of those items held as community property, following that in communications. Common ownership on a large scale is, in any event, constrained to only gradual expansion due to the supernational implications it poses (e.g., redeployment of a system from one country to another). Now, apart from such items of community property as headquarters and communications facilities (acquired by SHAPE and NICSMA, acting as host countries) most Infrastructure acquisitions fall into an area somewhere between collective effort and common ownership. Since it is the host country that procures the land, not NATO, legal title to the facilities constructed thereon, resides in the territorial host nation. However, it is also agreed that once a facility is no longer needed for NATO purposes the host country will compensate NATO for its residual value—a sum to be negotiated by the host country and NATO.

2. Distribution of Contracts

For the sake of simplicity one can divide NATO Infrastructure Program work roughly into two broad categories. The largest of these two categories is of the 'brick and mortar' type, which has historically accounted for some 65-70% of Infrastructure work[44].

The other 30-35% of the work involves sophisticated equipment such as communication equipment, radars, and computers, as well as the concomitant need for systems engineering work.[45]

The U.S. share of total work has been estimated as between 15 and 20%. This has involved primarily sophisticated equipment contracts, of which U.S. firms have captured roughly half. This currently translates into an average of between $150 and $200 million a year in NATO Infrastructure contracts for high technology work being awarded to U.S. firms. This excludes, of course the closely related $1.8 billion dollar program for NATO's AEW&C system (which, though commonly funded, is not an Infrastructure project).

Since 1967, under T. J. Loveland's regime as Director of the U.S. Mission's Infrastructure and Logistics Support Division, the U.S. has been a great opponent of selective production sharing. The U.S. has had to counter a general attitude among its allies which ignores production sharing for the 65-70% of the work in which U.S. firms have virtually no competitive position at all while pushing for production sharing for the sophisticated 30-35% of the work where U.S. firms are highly competitive. Although, with the International Competitive Bidding procedures, there is no system for distributing work by national shares, the U.S. insists that in figuring out how justly contracts are falling along national lines, its industry's share must be figured on the basis of the total program value, not just the juiciest part from the technological standpoint.

In the following chapter we will see how this has worked out for the NADGE and NICS programs two exceptionally large high technology programs, for which, contrary to the normal procedure, there was work sharing. The share of U.S. industry for NADGE was set at around 31%, and between 38% and 58% for NICS.[46] In addition, vis-a-vis NICS, it appears that the U.S. will be more toward the 58% than the 38%, since U.S. firms have captured the contracts for four of the five major NICS contracts awarded to date.[47]

3. Procurement Authorities

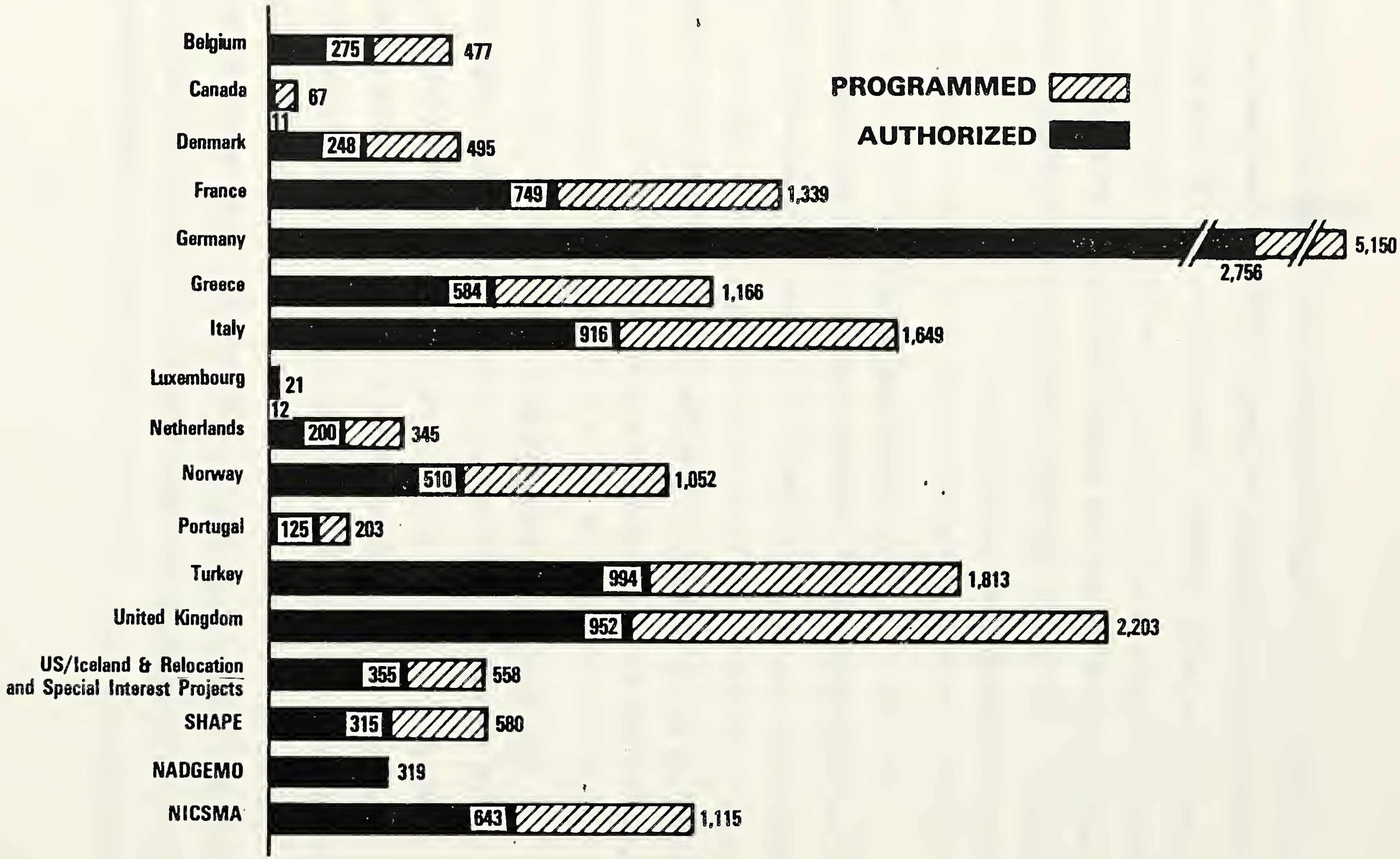
As already mentioned, the procurement function is accomplished in a highly decentralized manner for the NATO Infrastructure Program: either through international civil NPLO's; an international military organization (i.e., SHAPE); through one of the participating nations acting on behalf of all the participating nations; or some combinations of these methods.

a. National Procurement Authorities

Use of the national authorities has generally been the most pragmatic manner of procurement in that it minimizes the unnecessary duplication at the international level of management functions that could be performed by the existing national authorities under the international supervision of the P&P Committee. In such cases, the nation acting as the host country adheres to its national procurement laws and regulations, enforcing them regardless of the nationalities of the contractors or subcontractors. In the case of commonly funded Infrastructure, these are altered only to conform to D/2261.[48] Otherwise,

INFRASTRUCTURE DISTRIBUTION BY HOST NATION, 1951-1984

PROGRAMS THROUGH SLICE 41 AUTHORIZATIONS THROUGH 31 DECEMBER 84
(IN $ MILLIONS)



Source: OASD(ISP)

mandatory national statutes are respected. The majority of contract clauses, are naturally subject to agreement between the buyer and seller in light of the type of system being procured, the type of contract being negotiated, and the best interest of the contracting parties.

b. International Procurement Authorities: NPLO's

In those cases where it has been necessary to resort to a more centralized approach to procurement, a greater part of the management effort is shifted up to the international level, with a MNC[49] or an NPLO assuming host country status. This leads to a much more complex set of relationships on the governmental side of the procurement, resulting in a more fluid contracting environment.

Whichever of the two approaches is followed, the authority acting as host country retains considerable autonomy under the general overview of NATO's Infrastructure Payments and Progress Committee (P&P Committee). Of the few standard NATO procedures and clauses that have been established that apply to NATO Infrastructure procurement, there are those promoting a fair distribution of contracts through competition embodied in the "Procedures for International Competitive Bidding for Commonly Financed NATO Infrastructure Works," (AC/4-D/2261); along with several non-controversial ones in the field of quality assurance, embodied in the requirements, procedures and clauses agreed under STANAG's[50] 4107 and 4108,[51] in the field of codification and identification covered by STANAG's 3150 and 3151,[52] and those concerning inflation (e.g., escalation clauses cover labor only).

The several NATO authorities involved directly in NATO Infrastructure contracting (as opposed to national authorities acting on NATO's behalf) include primarily SHAPE which derives its international status from the Paris Protocols of June 1952, and the civil agencies (NPLO's) which derive their status from the Ottawa Agreement of September, 1951. Unlike the ad hoc membership of those NPLO's set up for weapons projects, the membership of Infrastructure NPLO's have been nearly Alliance-wide (plus or minus France and excluding Iceland). Both SHAPE and the several NPLO's have had a varying relationship with the national authorities for the various projects. SHAPE directly handled the procurement of the ACE-High system in the late '50's and early '60's, and the ground stations for SATCOMs I and II in the late 60's (though later transferring contract administration to NICSMA), while having relied almost totally on the USAF's SAMSO for the procurement of the satellite segment of SATCOMs I, II, and III. NADGEMO acted as the "central procurement authority" for the NADGE system, but relied primarily on the nine host countries for contracting, acting as host country for only some 10% of the funds expended. To date NICSMA has relied primarily on itself for contracting and only secondarily on national authorities, although use of the latter's services for civil works contracts may increase over time.

As is typical of the decentralized nature of NATO Infrastructure Program implementation, NATO procurement authorities currently undertake their procurement needs in accordance with the regulations drafted and implemented by each such authority. NPLO's are governed by the general provisions of Document,

C-M(62)18, April 28, 1962, "Regulations for NATO Production and Logistics Organizations," which concerns the status, organization, administration, staffing and funding of NPLO's, as well as arbitration,[53] audit, and security procedures. The regulations of the several procurement authorities may differ not only in detail, but in basic principles. Consequently, a contractor may be confronted with very different contractual requirements from the various NATO authorities, even for similar procurements. In the case of NICSMA, set up in 1971, this involved initially, considerable reliance on ASPR in the formulation of their own procurement regulations, but these have been watered down over time.

Since bidders and contractors should be able to expect reasonably similar contractual requirements and terms for similar procurements, regardless of which NATO procurement authority they are dealing with, The Conference of National Armament Directors' (CNAD) Working Group on Industrial Property (AC/94) prepared a document in 1974, with the aim of responding to this need—"Guidance for NATO Procurement Authorities." In order to encourage greater uniformity of approach in the procurement regulations and principles of the various NATO procurement authorities, Section II of this document, Annex I to AC/94 - D/244, provided a statement of the basic principles which NATO procurement authorities should aim to follow in carrying out their procurement functions. In addition, Sections III and IV provide a checklist to guide these authorities on points to be considered for inclusion in drafting NATO contracts, according to the circumstances of each case. As pointed out in AC/94 - D/244, other circumstances that need to be taken into consideration include: the requirements

of NATO and its member states; the system involved; the national laws to which contractors may be subject; and the effect of international treaties and agreements.

A NATO requirement for its NPLO's that is noteworthy is the necessity of the inclusion of an arbitration clause in all contracts of an NPLO. This is due to the special status of NPLO's derived from the aforementioned Ottawa Agreement that granted NATO and all of its subsidiary organizations immunity from the jurisdiction of national courts. This immunity does not apply to SHAPE or other military headquarters (whose status stems from the Paris Protocols) or for NATO contracts signed by national authorities acting as host countries, both of which ordinarily follow national dispute procedures of the country of their location. In SHAPE and national contracts for NATO Infrastructure projects, such an arbitration clause of course can be inserted in their contracts, if it is deemed necessary.

4. Some Comments on the Nature of NATO Infrastructure Contracting

In comparing defense contracting in the U.S. environment to contracting with NATO procurement authorities, one could say that NATO contracting in many respects is more like commercial contracting in that it places a higher degree of responsibility on the contractor. This is naturally in part a function of the type of systems involved, but is also related to its being an international organization.

NATO doesn't have the resources to closely manage the design or implementation of a project, nor does it change the specifications during the course of the work. A contractor can't rely on a succession of negotiated engineering changes increasing the contract price. When a NATO procurement authority signs a fixed price contract, it already knows what it intends to buy. NATO's major high technology projects tend to stay within the state of the art contracting with a prime to procure off-the-shelf items and to manage the systems engineering tasks, with generally less involvement from the contracting authority than is the norm in U.S. defense contracting. Although NATO continually faces price increases due to numerous delays encountered up to contract signature, it rarely faces the common scenario of national acquisitions, that of the price doubling before the ink is dry, due to a dilemma of defense acquisition—what the government thought it bought, not being what the contractor was bidding for. NATO authorities take considerable time on the front end, "in setting up their specifications and in negotiating the contract, and at the time the contract is signed, the contractor better be figuring on producing exactly what he agreed to produce, for exactly the price. NATO can't be looking over the contractor's shoulder and provide the sort of close management supervision common in U.S. contracting, it simply doesn't have the resources for it. There is no one saying to the contractor, Oh, you're doing this wrong. We want you to do it this other way... With just a small change, we could get a 100% better performance. But in making the change, you stop the contractor for a year and get triple the cost. NATO doesn't work that way.[54]

Even though NATO contract clauses may sometimes at first seem a bit draconian, the fact that they tend to leave the contractor more on his own, is probably an advantage, considering the way in which ASPR (now DAR) are often implemented. The problem comes in part from the highly personalized nature of defense contracting (as opposed to commercial contracting) in that "...contractors, particularly American contractors are used to dealing with American contracting officers. They know the things they can get away with and what they can't. Whereas, here, they're faced with people they can't talk to, people they don't know. Some of them speak different languages. And they're afraid that ASPR type decisions will be applied as stringently as they might be by the letter of the regulation rather than its spirit, and we have all seen some of the resulting disasters."[55]

There is one serious risk that the above scenario can entail, a point that will be borne out in the following chapter for NADGE and NICS. That is, when there are several layers of management on the government side of the contracting relationship which originate from different organizations with their differing assumptions—one international and several national in the case of NADGE, or within SHAPE and NICSMA in the case of the SATCOM II ground stations—a contractor occasionally finds itself between that proverbial 'rock and a hard place.' In the case of the NADGE dispute, there had been one contracting authority (at the international level), NADGEMO, which had been the primary interface on the governmental side throughout the bidding phase, and had been working under a set of assumptions involving much greater contractor responsibility and independence, as is the NATO norm. However, when the

national governments that came in later in the process to sign and administer the parallel contracts on behalf of NADGEMO and NATO, were acting under the assumption of strong management intervention on the part of the government, with the contractor having already been nailed down to a fixed price contract. A similar problem developed in the SEL dispute with SHAPE and NICSMA on SATCOM II's ground station segment, in part, over testing and other governmental prerogatives. Some of the personnel involved were acting on the basis of national and other assumptions that were inapplicable in the case of the NATO procurement.

Taking NICS as an example, in contracting for subsystems of the eventual system, such as TARE, IVSN, and the SATCOM ground stations, NICSMA places the entire responsibility for systems operation on the contractor. Since NICSMA has been ahead of itself, it lacked until recently an overall, detailed architectural plan. NICSMA has not really been certain how the subsystems will fit together. NICSMA only recently completed and put under contract its System Integration Program, which will integrate all independently procured subsystems into an Integrated Communications System.

Next, we'll focus on two important aspects of the ICB, the bidders conference and the dispute procedures, both of which manifest some of the unique characteristics of this contracting environment, one which involves transnational governmental cooperation within an established international framework.

5. International Competitive Bidding (ICB)—The Procedures

The "Procedures for International Competitive Bidding (ICB) for Commonly Financed NATO Infrastructure Works", AC/4-D/2261 (Final), 30th September, 1974, are superimposed on nationally run competitions. This is to assure that the industries of the other funding nations interested in bidding, will be competing on an equal basis with the host country domestic firms. This results in a rather complex relationship between the host country directly running the competition, the governments of the other participating nations acting as liaison for their industries, as well as the support provided by NATO's International Staff's Infrastructure Directorate, and the policy guidance of NATO's Infrastructure Payments and Progress Committee (P&P Committee). The part played by each actor in this process on the government side is roughly as follows.

(1) The host country:

- notifies the participating countries' embassies and delegations and the International Staff of its intention to call for bids;
- submits the request for authorization to commit funds to the P&P Committee;
- prepares the 'cahier des charges' (tender documents containing technical, administrative and contractual requirements/conditions);
- receives and analyses the bids, selecting the firm with the lowest responsive bid;
- awards the contract;

(2) The governments of the participating NATO countries:

- notify their individual national industries of the host country's intention to call for bids;
- defend the interest of their national industries should any disputes develop over the implementation of ICB;
- request review of technical specifications by the International Staff or the appropriate Major NATO Command (MNC).

(3) The NATO Infrastructure P&P Committee:

- provides approval for any deviations by the host country from the ICB procedures;
- authorizes the commitment of funds;
- generally advises the host country on various points.

(4) The International Staff's Infrastructure Directorate - provides advice to the host country on technical matters concerning, in particular, tender documents and the compliance of bids.

A condensation of the NATO ICB procedures, AC/4-D-2261, follows.

(1) Introduction

Based on the guiding principles of expediting the implementation of NATO Infrastructure works and avoiding discrimination against eligible foreign

firms, these procedures establish responsibilities and rights of the host countries, the competing firms and their countries of origin, and the Intrastructure Payments and Progress Committee (PPC)—up to and including contract signature or the issuing of a letter of intent.

In preparing the "cahier des charges" host countries are encouraged to ask the advice of the International Staff and/or the appropriate MNC.

(2) Definition of Terms

"Participating country"—a NATO country which has undertaken to share the cost of the Infrastructure project involved.

"Host country"—a NATO participating country, major NATO command (MNC) or NATO agency (an NPLO, e.g., NICSMA) which carries out the particular Infrastructure project.

"National firm"—a firm established in the host country.

"Foreign firm"—a firm established in a participating country other than the host country.

"Country of origin"—home country of a contracting or subcontracting "foreign firm."

"Cahier des charges"—the tender documents containing technical administrative and contractual requirements/conditions.

(3) Security

For the security procedures and requirements in connection with NATO classified Infrastructure works reference is made to AC/35-0/259 as amended, and the provisions of C-M(55)15 (Final) for the general rules for the protection of NATO classified information.

(4) Principles of Non-discrimination

In all cases for which international competitive bidding (ICB) is prescribed, host countries must ensure that eligible foreign firms are given no less opportunity to submit their bids, than national firms. Tenders of competing eligible foreign firms must not be treated less favorably than those of national firms.

(5) Eligibility

Only firms from participating countries are eligible. Firms become eligible once a "Declaration of Eligibility" has been issued to a responsible authority of the host country, by the government of a foreign firm's country of origin.

(6) <u>Procedures governing cases where eligibility is in question, concerns</u>:

(i) the two procedures to be followed (one for non-classified and one for NATO classified contracts) if a foreign firm which has not been subject to a "Declaration of Eligibility" asks to be invited to participate in a call for tenders;

(ii) the procedure for general technical and financial screening of any firm by the host country;

(iii) the procedure to be followed should the host country wish to eliminate a firm on the basis of either of the procedures laid down in subparagraphs (i) and (ii) above.

(7) <u>Official notification of a call for bids, concerns</u>:

(i) and (ii)
the procedure for informing the embassies and delegations of the participating countries as well as the International Staff's Infrastructure Directorate (hereafter referred to simply as the International Staff) of its intention to call for bids covering the general description of the type of work involved, and the content of the information to be supplied.

(iii) the procedure to be followed for a request by a host country to the Payments and Progress Committee (PPC), that the PPC direct that an accelerated ICB should be held due to the urgency of the project.

(iv) procedure to be followed in the reopening of the eligibility list for prospective bidders, if the host country does not invite tenders within the 12 months following the final date, by which firms must make known their desire to be invited to tender.

(8) Time allowed for submitting tenders concerns:

(i) and (ii)
the closing date for bids, varying according to the scale or complexity of the project and whether or not the "cahier des charges" must be translated.

(iii) deadlines—should the host country decide that calling a bidders conference to clarify requirements is warranted; and if so for informing the prospective bidders of any resultant clarifications or changes in the "cahier des charges."

(iv), (v) and (vi)
procedures for submitting requests for extensions of the time limits covered in subparagraphs (i) and (ii) above, which

can only be done by a government agency or by the NATO delegation of a firm's country of origin, and if granted, for advising the firms concerned.

(9) Review of Technical Tender Specifications

Any national delegation has the right to request that the International Staff and/or the appropriate MNC examine the technical specifications of the "cahier des charges." The results of any such study are then reported to the PPC for the appropriate action.

(10) Reduction in the Number of Competing Firms

This concerns the procedure to be followed, should the host country, under the guidance of the PPC wish to reduce the number of competing firms.

(11) Deposits for the "Cahier des Charges"

The host country has the right to request the prospective bidders for a deposit at delivery of the "cahier des charges," up to a maximum of 0.1% of the cost estimate of the work and supplies.

(12) <u>Award of Contracts</u>:

(i) Ordinarily a host country will award contracts to the lowest bidder in conformance with the "cahier des charges," but if it wishes to act otherwise it must seek the approval of the PPC.

(ii) The procedure to be followed before a contract can be awarded: should a host country intend to eliminate the lowest bid as not being in conformity (in the case of projects other than those covered in subparagraph (iii); and should the government of the firm's country of origin wish to appeal, settling the matter either through informal negotiation or under the ICB arbitration procedure (see following subsection on Arbitration).

(iii) procedure to be followed: for submission of bids for complicated projects for which the host country requires bidders to submit technical proposals based on performance specifications, and in those cases where the PPC specifically so directs; should a host country propose eliminating a bid considered not to be in conformity with the "cahier des charges," and should the government of a firm's country of origin wish to appeal.

(iv) the right of appeal of a notification of rejection expressly excludes the right to alter any part of the bid.

(v) the host country must obtain prior approval of the PPC should it wish to deviate from the above.

(13) Results of Calls for Bids

This covers the deadline and information to be included in the forwarding to the International Staff of the results of all calls for bids.

(14) Procedure in Case of a Renewed Call for Bids

Should the host country decide not to award a contract on the basis of the tenders received, this procedure covers the process by which the host country, with the advice of the PPC, proceeds to a new call for bids.

(15) Notification by Airmail

All notifications to be made in pursuance of these procedures will be sent by airmail except where proximity renders this unnecessary.

6. ICB - The Process

a. Certification

To become involved in NATO Infrastructure Program contracting, firms must be certified by their respective governments as to their technical competence,

financial viability, and appropriate security clearances. For U.S. industry this is handled by the Commerce Department. Companies must complete necessary application forms for this certification which are available from the Major Projects Division, Room 3056, Bureau of Export Development, U.S. Department of Commerce, Washington, DC 20230.[57]

These NATO contracts are placed by the following authorities: the individual NATO host countries, Supreme Headquarters Allied Powers Europe (SHAPE) in Belgium, the SHAPE Technical Center in the Netherlands, the NATO Integrated Communications Systems Management Agency (NICSMA) in Belgium, and the NATO Maintenance and Supply Agency (NAMSA) in Luxembourg.

Separate forms are to be completed for each part of a company which will be competing for NATO contracts. Certifying a parent company only will not cover divisions or subsidiaries at separate addresses.[58]

Applicants for certification are requested to give the name and address of subsidiaries or agents in other NATO countries in the event NATO or a host country wishes to make contact with them. However, to take the example of the U.S., the Department of Commerce does not certify U.S. companies' overseas branches or any agents located in NATO countries. They must be certified by the government of the country in which they are located.[59]

Applicants for certification are to provide to their governments a resume of their operations, with special reference to the kind of work for which they wish to be considered by NATO, and a copy of literature describing the products the company wishes to sell to NATO.[60]

As for financial viability applicants are to submit a copy of their annual report and their latest balance sheet.

Applicants must provide the security clearance level of the company units proposed for certification. This is established through the Defense Contract Administration Services Regions (DCASR) for U.S. firms. Most NATO requests for quotes on projects are classified, and they will not be sent to companies without appropriate security clearances.

An exception to the requirement of security clearance may occur when there is an unclassified tender and no need for a bidder to have access to classified NATO sites. Such tenders though are the exception not the rule.[61]

Applicants must identify the Standard Industrial Classification (SIC) codes of products and services they wish to sell to NATO. The SIC manual containing the codes is available in the U.S. from the Government Printing Office, public libraries, or Commerce District offices. The Commerce Department also sends certification applicants a list of codes covering communications, electronics and data processing.

Notifications are sent, in addition to the companies concerned, to the national delegations to NATO (or 'Mission' in the case of the U.S.), SHAPE, SHAPE Technical Center, and to national Embassies in the other NATO countries. The national Ministries of Defense (e.g., the DoD's Central Registry) also receive notification to assist in establishing authorization for the distribution of documents to bidders on NATO projects.[62]

b. Bid Opportunities - The Drawing Up of a Bidders List

Once you become certified, opportunities to bid on NATO Infrastructure Program contracts will follow. The Commerce Department and its counterparts in other NATO countries learn about trade opportunities through communications received from:

- The Embassy in Brussels so far as NICSMA and SHAPE are concerned;
- The Embassy in the The Hague for SHAPE Technical Center (STC);
- Other Embassies in NATO countries reporting tender offers by national governments acting as host country.

The national delegations (or missions) to NATO, located in Brussels in the NATO Headquarters complex, are in some cases also a source for a request for interest.[61]

The Shape Technical Center (STC) also goes directly to suppliers, but with a note that they must be certified by Commerce Department (or its allied

equivalents) to participate in bidding. The NATO Maintenance and Supply Agency (NAMSA) in Luxembourg goes directly to suppliers. Both STC and NAMSA have libraries containing excellent sources of information on suppliers; however, it would be in a company's interest to send the latest copies of its product literature to assure coverage.[62]

Companies also may obtain advance information on NATO Infrastructure Program plans, including those in host countries, through official documents. For example: what equipment is under consideration; where will it be used; and how much will be budgeted for it? Firms often become aware of NATO intentions prior to formal requests for interests: while working on other NATO projects or those of national armed forces installations nearly; from national missions or delegations at NATO HQ; and sometimes they have been consulted for their expertise by SHAPE, STC or NICSMA.[63]

It is important for contractors to detect the requirement as soon as it starts to evolve and to help with the details of the requirement. Before nations submit prospective projects, the NATO military authorities must have given guidance that such projects will be accepted in a particular annual slice. A contractor should be very involved in the preparation of the initial budgetary or "A" estimate in order to help the host or the user nation (or in some cases the military command) to understand what kinds of equipment are available and what the expected price would be for various levels of sophistication.[64]

When it becomes evident that the project is going to be accepted, contractors should be as involved as possible in the preparation of the specifications. At this time, the host nation is busily making market surveys and trying to determine how this project can best serve his own and NATO's interest.[65]

In the U.S., Department of Commerce (US DOC) oftens learns of advance notices of tenders from industry, and the Department's follow-up frequently will assist in acquiring valuable information on the status of such tenders. Also the Major Projects Division of Commerce is a repository for SHAPE budget documents, which are available for review by company officials with the required security clearances.[66]

When official announcements of tenders are received at the Commerce Department from U.S. Embassies in Europe, or other government sources, they are made known to the business community through:

- Commerce Business Daily,
- The Department of Commerce's subscription Trade Opportunities Program,
- When required by a particularly short deadline, through direct mail announcements, or even by a telephone poll.[67]

These initial calls for a list of eligible/interested firms are called "Official Notification of Intention to call for Bids". The Commercial Attache at the U.S. Embassy concerned cables notification with a description and deadline for names to Department of State and USDOC/MEPD.

As previously noted, for each NATO Infrastructure project a contracting and International Competitive Bidding (ICB) agency, called a "host country" is designated. Such "host country" will be either a sovereign NATO country or a NATO procurement agency or Command (like NICSMA or SHAPE).

In either case the host country/NATO authority deals with the U.S. Commercial Attache and his counterparts at the local Embassies for the call for a bidders list and the submittal of national nominees. When the procurement authority is located in the U.S.—i.e. either NATO's Supreme Allied Command Atlantic (SACLANT) at Norfolk, Virginia, or the U.S. is designated as the host country—a similar channel is involved. Here notification and nomination are handled through the Washington D.C. Embassies of all participating NATO countries, and directly with USDOC/MEPD for the U.S. All U.S. host country functions (i.e. facilities in U.S., Puerto Rico, Iceland and sometimes Bermuda) are handled by the U.S. Naval Facilities Engineering Command (COMNAVFACENGCOM) at 200 Stovall Street, Alexandria Virginia, 22332.[68]

c. <u>Invitation For Bids (IFB's)</u>

Channels for distributing IFB's, or as previously noted, 'cahier des charges', as they are often referred to in NATO parlance are spelled out in NATO's International Competitive Bidding (ICB) procedures (NATO Document AC/4-D/2261).

These break down as follows:

(1) For unclassified IFB's, the host country or responsible NATO authority sends them out by air mail directly to each nominated firm.

(2) For classified IFB's (NATO restricted or higher) the host country/NATO authority delivers them to the local Embassy of the firm's country of origin for distribution by the Ministry of Defense through industrial security channels (for the DoD this involves the Pentagon Central Registry).[69]

Once tender documents have been distributed to prequalified bidders by NATO and host countries, a six to eight week deadline normally follows for companies to submit their bids. An extra week is allowed for classified IFB's.[70]

Delays may occur for companies through late receipt of the documents, to get required reference documents, or for other reasons. NATO rules require a three-week extension if any national delegation requests it. Thus, when a contractor needs some extra time, U.S. firms should notify the Commerce Department and the U.S. Mission will make sure that the three weeks are granted. A further extension is possible if it can be justified and the host nation convinced of the requirement (e.g., if sufficient changes evolve from the "Bidders Conference" showing that good bids could not be prepared in the remaining time). When necessary, the U.S. Mission can normally gain agreement that U.S. bids need only to be delivered to the Commerce Department in Washington by the

deadline date for submittal to European offices, most notably those for SHAPE and NICSMA in Belgium.[71]

The dates of a "Bidders Conference" will be specified in the IFB. Prior to this conference contractors are expected to either have forwarded lists of questions, or direct their inquiries during the conference, in order to share the information learned with all concerned.

The IFB will specify (among other things), any requirement for production-sharing. Which is sometimes required for the larger projects where the Europeans and Canadians fear U.S. industry's strength could lead to its monopolizing all the sophisticated work.[72]

The U.S. Mission has a great deal to do with the production-sharing formula. Of particular interest is that it not require too much layoff of sophisticated work in order not to discriminate against highly-efficient U.S. contractors. The U.S. Mission therefore negotiates for as low a layoff as possible and, in general, has been fairly successful.[73]

Another aspect of the problem concerning work distribution along national lines involves the manner in which the 'cahier des charges' is written up. Host nations are normally very careful not to slant the document in order to restrict competition (at least not unless it is to the advantage of their own national contractors). Thus the U.S. Mission depends on the U.S. contractors to screen

the specifications and let them know if they appear to be discriminatory to U.S. interests. This is an important contractor function since it is rare that anyone in the U.S. Mission to NATO reviews a specification before it is issued. And of course a If design, plans and specifications for a project appear to be so tailored that they do, in fact, rule out true international competitive bidding, the U.S. Mission to NATO can make proper investigation and, if need be, call a halt to the bidding which is underway.[74]

Joe Loveland of the U.S. Mission to NATO emphasized at the AFCEA symposium that,

> It is important that bidders let us know when they are not satisfied with the specifications. We have had many cases in the past where contractors have decided not to bid on a particular set of specifications because they believed that they were either discriminatory (and that the Mission could not do anything to rectify the situation) or that any critical comments against the host nation's specifications would act against their interests in an eventual bid.
>
> NATO contracts do not work that way. We have as much to say as anyone about whether or not a specification is acceptable, serves the best of NATO's interests and does not discriminate against U.S. contractors. I therefore ask you today to be open with us and let us know about anything which might prevent you from bidding which we might be able to help you.[75]

Any problems that may arise for U.S. firms frequently can be resolved through the U.S. Mission to NATO or our Embassies which, through their persuasion to foreign governments or NATO organizations. In other instances, it may be necessary to invoke provisions of international competitive bidding (ICB) rules of NATO.

The example of assistance cited by the Commerce Department's Hayden in resolving a problem for U.S. companies in bidding involved Turkey and Greece. Both countries had insisted that applicants for bidding each must submit certification from their MOD's that they have sold equipment similar to that in the tender to their own government. These certifications are difficult to acquire except through intercession of the foreign government offering the tender. We in Commerce have worked out arrangements whereby Commerce, after confirming the companies' record of contracting with DOD, attests to the companies' experience. Our Embassies then forward a diplomatic note to the Ministry of Defense with our official certification.[76]

As mentioned earlier, the procedures for distribution of IFB's frequently cause delays in companies' receipt of documents. In addition to the granting of bid deadline extensions to companies to compensate for delay, the U.S. government will intervene to expedite distribution. Other host countries have insisted that bidders pick up documents at their ministry of defense on a given date and hour. This is impractical for U.S. bidders because our security regulations prohibit transfer of classified NATO documents outside a country of origin, except by an official channel authorized for this purpose. Arrangements have been worked out where U.S. Embassies acquire the documents and forward them to Commerce for transmittal to bidders.[77]

NATO tenders often make reference to various NATO, national, international, or private organization technical documents which appear to be necessary for

bidders to consult in the preparation of their bids. Companies have often found how time-consuming it is to obtain these documents. As time passes, it becomes a bit easier to access them although much remains to be done in this area. Through the efforts of the national Delegations Missions to NATO and Embassies, extensions of bid deadlines have been acquired to allow companies to complete the preparation of their bids. Arrangements are being worked out whereby only those documents absolutely essential, and copies are available, should be listed in the tenders. Also, DOD, recognizing the problems for U.S. bidders, was arranging in the late 70's for a Sub-Registry in Philadelphia to stock many of the likely documents to be required by bidders and to acquire special documents. Until this service was fully establishedCommerce was to continue to meet U.S. companies' needs as best it could.[78]

There are tenders for which a long list of U.S. companies apply for prequalification, but not more than one or two companies tender. U.S. Companies encountering situation, of this type such as a poorly or unfairly written specs should contact, as soon as possible, either the Major Projects Division in Commerce, or the U.S. Mission to NATO. The matter will be referred to the appropriate organization within NATO to get a review of specifications. We have learned from experience that early advice to us is vital if we are to help.[78]

Since 1979 national governments have been able to provide a list of companies prequalified for bidding on a particular NATO project. SHAPE has also published

the complete list of names of firms nominated by all NATO countries as eligible, qualified and interested as prime contractors in a number of non-civil works projects valued over 100,000 Infrastructure Accounting Units (IAU). Plans are for all host countries to publish the total lists of prime bidders they obtain from NATO nations. The U.S. Commerce Department announces the availability of this list through Commerce Business Daily, and the Department's "Trade Opportunities Program." The purpose of publishing is to let other firms, who may be interested as subcontractors, to know of all the others who have shown interest as prime contractors.[83]

d. Bidders Conference

Normally, for a complicated or large-scale project, a bidders conference is held within four or five weeks from the time that the IFB has been issued. The bidders either forward their questions in writing, or come to the conference with their comments in hand. NATO strongly encourages the contractors to have their questions ready when they arrive.[84] The input at the conference concerns all aspects of the eventual contract, but especially the specification. Everyone gets all of the questions and all of the answers.[85]

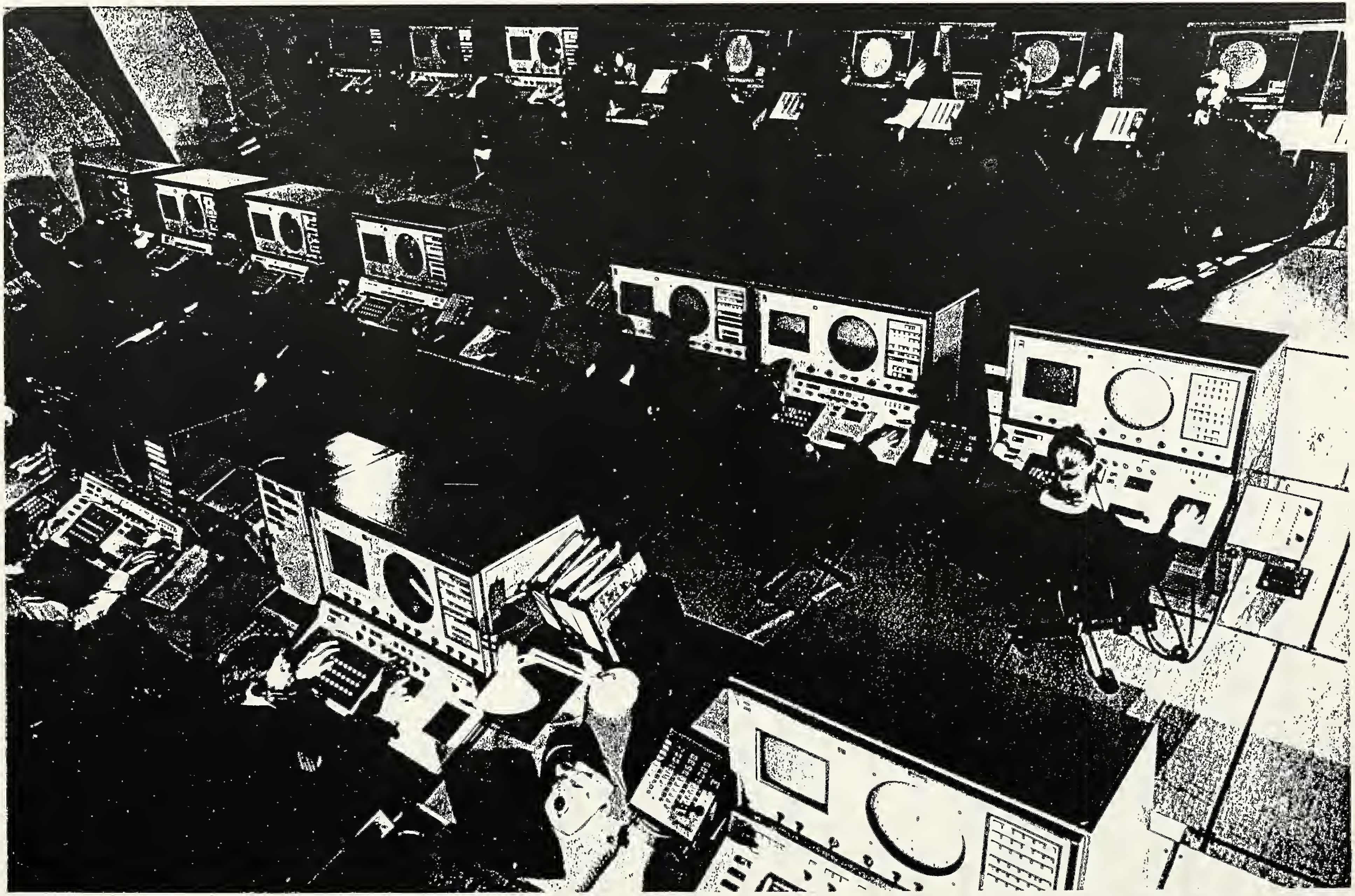
As an example of this, during the bidders conference for NICSMA's TARE system (won by Litton and presently totalling some $51 million in work), certain of NICSMA's general clauses were watered down considerably as a result of conference input. This concerned points that were going to cost a lot of money, and involved considerable risks, while doing nothing for NATO. As an example,

FOXC/Disk 837/B.NATO/INFRA.

the original payment schedules were slow, and as a result required the contractor to pay considerable interest charges on money that he was using to finance the project. NICSMA therefore agreed to change the payment schedule so as to stay even with the contractor and thereby avoid a negative cash flow.

The winning of a NATO Infrastructure contract, as the lowest bidder, is conditioned upon the bidder being 100% compliant with NATO's specifications. If there is 100% compliance in the technical bid, then the price envelope is opened - a condition that often leads to a thinning of the ranks of the bidders. Once the Invitation for Bids (IFB) has been issued there is no room for proposing on the basis of alternative technical proposals, though of course refinement is possible. Due to the relevance of specifications to the competitive position of a given nation's firms in the high technology projects, the in-fighting of national representatives on the governmental side would result in a 'can of worms'. Although NATO's authority is constrained by this problem this is inevitable in contracting in the international arena for commonly funded projects, since everyone naturally suspects everyone else of being highly partisan.

The one advantage, as opposed to the major disadvantages involved, resulting from the NADGE projects excessively tight 98% zero balance of payments (BOP) impact stipulation was just this. Final specifications did not bear on the share of the work that each nation's industry received and, hence, agreement was more easily attained on them. Thus, the intergovernmental competition was



Source: NATO Information Service

Plotters at work before data display consoles at a NADGE Operational Control Center in Denmark

effectively transferred to the three competing U.S. led international consortia.[86]

Consequently, NATO contracting has to be done in a gold-fish bowl. Obviously, no specification is perfect, and contractors can forward to their delegations complaints or recommendations about specifications up to two weeks before the closing of the bid. If their national authorities agree that they are discriminatory, or are not cost-effective, changes can be made.

e. <u>Submittal of Bids and Source Selection</u>

Once again, bid proposals by companies must be in strict compliance with conditions in tender documents, or 'cahier des charges'. If NATO wants the manufacture and delivery of a 1920 Ford, that is exactly what they want, nothing more or less. Attempting to sell a product which may be superior, but cost more than what is called for, may cut a bidder out of running. By the same token a bidder must be absolutely sure his bid proposal will meet the minimum requirement for which the end product is intended.[87]

If a U.S. company received a classified tender document from a host country, but decides not to bid, the company may wish to return it to the Major Projects Division of Commerce in accord with security regulations rather than to risk a security violation by sending it back to the host country improperly.[88]

Another relatively new procedure assists bidders in submitting their bidding package to SHAPE, NICSMA, and host countries. Under this procedure, U.S. bidders may deliver their packages to Major Projects Division of Commerce rather than attempting to get them to the organization offering the bid. This has an advantage in that it offers U.S. bidders an extra week or two to prepare their bids compared with old procedures when bids had to be sent to Europe.[89]

The U.S. Mission's Joe Loveland offered the following advice to contractors an structuring and submitting bids:

(1) If you bid, you have accepted the specifications. We will not later entertain-a request for a dispute against the specifications for a contractor who had bid without protest. This is only fair to other contractors who have bid against the specification as it stood at the time of the bid submission.

(2) You get nothing for excellence. The specification called for exactly the quality that NATO thinks it requires. If you cannot convince host nations to upgrade specifications before the bid, do not expect that surpassing the specification in technical excellence will get you anything. Frequently during the evaluation process, a host nation will enter into a dialogue with one or more of the contractors. Contractors are allowed to change their bids only in the event they need to supply clarification.

> We have had frequent cases of tricky responses to host nation requests for information. Most of these cases have led to the disqualification of the bidder. The only good answer to the questions concerning the compliance of your bid with the request for quotation is, "We meant this to comply, and it will; we do not dispute your specifications."[90]

Loveland reemphasided: "If you have detected that compliance is important in NATO bids, you are perfectly correct. There is nothing that can affect your bid as much as either a statement of non-compliance or a detection of non-compliance by the host nation."[91]

If NATO and host countries find a company's bid non-compliant with tender specifications, they must state the reasons why. A company declared non-compliant by NATO may file a request for reevaluation. The company may offer clarifications of questioned positions, but may not change its bid. A U.S. company may go directly to the U.S. Mission to NATO or to the Commerce Department which will bring the appeal to the attention of the Mission. But, don't wait.[92]

NATO and host countries determine to whom contracts shall be let, using the criterion of lowest bid price of the company compliant with specifications. If an award is to be made to other than the lowest bidder, the decision must be made by the NATO Infrastructure Progress and Payments Committee (on which, of course, the U.S. Government is represented).[93]

Once it is decided that all or a certain number of the bidders are compliant (and those considered to be non-compliant have either accepted that fact or lost their dispute), the price envelopes of the remaining contractors will be opened.[94]

From this point on, a single rule is followed—the low bid wins. This sometimes takes a short period of price analysis, but basically the lowest clear bid wins the contract. Announcement of the, result will normally be followed by a letter of intent to the successful contractor.

Contract negotiations prior to signing can be quite protracted as they cover such items as any final adjustments to the specifications—either those suggested by the contractor as leading to a more efficient operation or a less costly product, or those from the client in order to improve his original specifications.[95]

f. <u>Mullen's Comments on How the U.S. Mission Helps U.S. Firms</u>

- We give you copy of NATO Infrastructure ICB Rules (AC/4-D/2261 (Final), 30 September 1974).
- We respond when you ask for help.
- We stress things that must be done to meet agreed deadlines.
- We act as official advocate for U.S. firms on Bidders Lists for all valid purposes.
- We protect your rights and prevent discrimination.

- We try to intervene when you may fail to meet deadlines and rules.
- We certify your eligibility and hope you bid.
- We contest your elimination as a bidder, if justified.
- We seek more time for ICB steps against deadlines where delays are not your fault.
- If you alert us in time, we call for review and revisions of IFB specifications.
- In disputes, we are your mouthpiece/advocate if you are the target; and protect your bids where other bidder is the target.
- We at NATO, or the U.S. Embassy in case of sovereign host countries, are your only channels for reclama. (Firms lose time trying direct contact.)

Note that the U.S. Mission gives out many copies of the ICB rules, and does all it can to clarify, if U.S. contractors ask. If they don't make it a point to read the document and ask about it, they may miss the opportunity to gain important knowledge.[96]

g. <u>Mullen's advise on how U.S. industry can help itself:</u>

- You must become aware of NATO ICB rules.
- Complete USDOC's necessary requirements to be cleared for elibility and security.
- Keep close watch on USDOC's notices of projects.
- Visit NATO headquarters via U.S. Mission in Brussels (also SHAPE, SACLANT, NICSMA, NAMSA).

- Keep your security clearances current.
- Come and ask to see what projects are coming.
- Be sure to be put on specific bidder list for each project.
- Examine USDOC notices for deadlines and any special conditions.
- Examine IFB specifications early for any significant slanting or over-restrictiveness.
- Tell USDOC and USNATO early if specifications need review for possible revision.
- Do not give up before you see all IFB amends.
- Tell us why before you decide non-bids.
- Come see us.
- Ask and learn when Annual Infrastructure Slice (list of projects) is approved.

> Remember, we do not get copies of the IFBs, with their technical specifications. The only way that we find out that a "spec" may be highly restrictuve or slanted is by U.S. bidders telling us. If you see one, and prepare an anonymous listing of the parts or paragraphs and a comment, we could adopt as a U.S. government position before the original specified bid closing date, and we can intervene to cause a revision.[97]

Mullen wrapped up with the following comments,

- Learn what projects are in pipeline. Read the rules.
- Tell us when you have doubts or you expect possible problems.
- Do not waste time trying to deal directly with a host country to change things like deadlines, restrictive specifications, or alternative places for delivery of bids.

- Be sure your address on bidder list coincides with your security cleared address.
- Tell USDOC and us the exact dates you received IFB's, etc.
- Tell USDOC and us right away if an IFB has hard-to-get references.
- Tell us early:
  - (a) That you are interested in project.
  - (b) That you are going to be prime.
  - (c) That you will try to be sub instead.
  - (d) If you know who is going to bid.
- Tell us, and we will tell you what we know.[98]

<u>7. Arbitration (Condensation of Annex I to AC/4-D/2261 (Final))</u>

Most cases involving a divergence of interest among participating countries concerning the application of rules for ICB are settled, as is to be expected, without arbitration. However, in those cases where agreement cannot be reached quickly enough to avoid excessive delays in signing contracts, a procedure has been developed which provides 'countries of origin'[99] with a means of ensuring that host countries do not discriminate against their firms during the bidding process. Disputes are normally between a host country and one or more countries of origin representing their industry(s).

Disputes are limited to the following seven cases:

(1) the non-observance of procurement procedures contained in D/2261, if it can be demonstrated that this has led to discrimination against one or more firms;

(2) the admission or non-admission of a firm to submit a bid;

(3) the sending out of invitations to bid in such a manner that some eligible firms are prevented from submitting a bid, even if they do so desire;

(4) the wording of a "cahier des charges" in such a way as to restrict competition unduly;

(5) the determination of the lowest acceptable bid conforming with the "cahier des charges;"

(6) the conformity or non-conformity of bids received with the "cahier des charges;"[100]

(7) the non-observance by the host country of the time limits prescribed in paragraphs 6, 7, 8 of D/2261 (i.e., procedures governing cases where eligibility is in question, official notification of a call for bids, and the time allowed for submitting tenders), if this leads to discrimination against a prospective bidder.

Depending on the nature of the complaint, the time limits involved are as follows:

(1) complaints falling under (1), (2), (3), and (4) above, should be lodged with the host country and notified to the Payments and Progress (P&P) Committee before the closing date for submission of bids as originally established by the host country;

(2) complaints falling under (5) and (6) above should be lodged within three weeks of the time limit provided for under paragraph 12(ii)a of D/2261;

(3) complaints under (7) above should be lodged within two weeks before expiration of the time limit(s) not respected by the host country.

The delegation of a country that alleges the incorrect application of ICB principles and procedures, simultaneously submits a formal request to the host country to suspend the placing of the Infrastructure Contract, and notifies NATO's Infrastructure Payments and Progress (P&P) Committee of its action. The host country immediately complies with this request and a period of three weeks is allowed for the parties to reach an amiable settlement. At the meeting of the P&P Committee following the expiration of this three week period the parties concerned report on the progress of their discussions. If an agreement has not been reached and the P&P Committee decides at this meeting that an extension of the three week period is not justified, or the disputants

do not request one, a formal dispute will be deemed to exist and the P&P Committee will open discussion on the points in dispute.

If the dispute cannot be resolved within two consecutive weekly meetings of the P&P Committee there are several possible courses of action available. First, if the dispute is between a firm's country of origin and another national government acting as host country it will begin the rapporteur/arbitration course. Secondly, if the dispute is between a firm's country of origin and a major NATO command (MNC, e.g., SHAPE) or NATO Production and Logistics Organization (NPLO, e.g., NICSMA) acting as a host country, then a Panel of Investigation is set up that presents an advisory opinion to the P&P Committee for a decision. In addition, at any time throughout either of these two courses of action that the process reaches an impasse the issue can be referred up to the diplomatic level, the NAC/DPC, for resolution.

In the case that a dispute is between a firm's country of origin, and a national government acting in the capacity of a host country, the P&P Committee will invite, on a rotational basis, not more than two participating countries in no way concerned in the dispute to each appoint a rapporteur to examine the evidence submitted by each disputant. Within fourteen days (with a possible extension to twenty-one) after appointment, the rapporteurs will submit a written report to the P&P Committee that will not contain any recommendations, and that will be stated, if possible, in a manner mutually acceptable to the delegations principally concerned in the dispute. And if, after three

consecutive discussions of the rapporteurs' report in the P&P Committee, no agreement is reached, the P&P Committee will submit the dispute to resolution by a Board of Arbitration, if so approved by the disputants.

Concurrently with this submission, the P&P Committee asks the Secretary General to request that: either three non-involved participating (i.e., funding) countries each designate a member to serve on the Board;[101] or designate an officer of the International Staff and request that two participating countries each nominate a member. The Board then meets within two weeks after the Secretary General's notification of the P&P Committee that its composition has been settled—at which time the dispute is closed to discussion in the P&P Committee. The Board establishes its own rules of procedure, but which must provide for, inter alia: an exchange of memoranda in which the parties in dispute shall state their positions; and at least one hearing of each party to the dispute. The Board reaches a decision on the basis of the principles and procedures of ICB as contained in D/2261 and the evidence produced, and presents it to the P&P Committee not later than four weeks after the Board's first meeting. The decision represents the majority view and is final. No minority view can be expressed nor appeal allowed. The participating nations concerned then take the necessary steps to implement the decision.

An alternative course to the one above, is followed if the dispute involves an MNC or NPLO acting as a host country. If proposed by any participating

country and so approved by the parties concerned, the dispute will be referred to a Panel of Investigation. This Panel is formed and conducts its proceedings in the same manner as the Board of Arbitration, except that, instead of an exchange of memoranda stating each party's position, the parties concerned each submit to the that is in dispute. The Panel may call for further evidence but must present its advise—not the final decision—and the reasoning behind it—to the P&P Committee within four weeks of its first meeting. The P&P Committee must decide (unanimously, through a reaching of a concensus, as is always the case in NATO decision making, at the committee or, if not, at the Council level) within two meetings following the receipt of the Panel's advice.

If there has been no agreement between the parties, by the next meeting of the P&P Committee, following the one in which either the rapporteur, the arbitration, or the Panel of Investigation procedures were to be resorted to, the issue is then referred up to the diplomatic level for resolution—the Secretary General submitting it to the NAC/DPC. If the dispute has not been resolved in the course of one discussion by the NAC/DPC, the Secretary General submits it to a Group of Independent Advisors, in order to assist the NAC/DPC in reaching a decision. This Group will be formed along the same lines as the Board of Arbitration, except that the P&P Committee is replaced by the NAC/DPC and the Group reaches an advisory opinion, not a decision, as with Panel of Investigation.

8. Foreign Exchange Transactions

In order to insulate contractors from gains or losses due to changes in exchange rates NATO's Infrastructure Committee adopted in January 1977, a procedure, (ANNEXES II & III to AC/4-D/2261 (Final)) that allows contractors to specify during their submission of bids the extent to which they and/or their subcontractors will have expenses in currencies other than that of the host countries (if the host country does not permit contracts to be expressed in foreign currencies), or other than that of the contractor's country's currency (when the host country is a NATO agency), being compensated accordingly for any fluctuations when paid.[102]

9. Audit of NATO Procurement Agencies

National auditors have no authority to audit NATO. Instead, the nations rely upon the NATO Board of Auditors to meet their fiscal audit requirements. The Board of Auditors is made up of representatives of five nations, serving on a rotational basis. The NATO Board of Auditors is responsible only to the North Atlantic Council. The Board audits the accounts of the International Staff, the International Military Staff, the military headquarters, the NPLO's, and accounts relating to the NATO Infrastructure Program. Taking the U.S., for example, national audits of its contributions for the NATO Infrastructure program are restricted to expenditures recorded on DOD records, backed by data developed by NATO, and audited and certified by the NATO Board of Auditors.[103]

The members of the NATO Board of Auditors are appointed by the NAC, after selection by their respective governments (who also pay their salaries—unlike the International Staff). The Board is assisted by members of the International Staff. For the NATO Infrastructure Program the Board audits the financial statements prepared by the host countries throughout and upon completion of the contracts, in order to ensure that expenditures charged to NATO's Infrastructure funds have been properly used for the authorized purposes. The Board quite frequently finds that the host countries have charged national costs to NATO, or have not charged all NATO costs to NATO, and this results in rectifications of the final bill. As of 1968 the Board had recovered some 14 million pounds sterling following the completion of NATO Infrastructure projects.[104] As an auditing body the Board concerns itself with the misallocation of NATO funds only, not with mismanagement, short of cases of gross negligence.

10. Conclusion

In conclusion, over the last three decades the NATO Infrastructure Program, has developed into a highly effective and significant area of allied collaboration in defense procurement. This program has not only proved advantageous to each member state individually, both militarily and commercially, but has also served as an important integrating force that has strengthened alliance solidarity tangibly, as well as in general terms. As we'll see in Chapter 5, the allies have been much more successful in the area of infrastructure than in the much larger armaments field in following an integrated alliance-wide

approach to procurement. In armaments the alternative to a unilateral approach has been consortia of several allied nations only. The following Chapter deals with those major equipment projects that are part of the alliance infrastructure effort.

The NATO Infrastructure Program provides an important foundation block upon which the present RSI efforts can erect a more credible deterrence against the forces of "liberation," in the North Atlantic region. Additionally, the NATO Infrastructure Program's Early Warning/Command and Control component has recently spawned a highly significant parallel program, the NATO Airborne Early Warning & Control (AEW&C) program, one in which the organization is procuring 18 Boeing E-3A AWACS aircraft.

C. The U.S.[105] and the NATO Infrastructure Program

1. U.S. Policy

Prior to 1968 the U.S. share of NATO Infrastructure Program costs was financed through foreign aid legislation under the Military Assistance Program (MAP). In 1968, Congressional action transferred financing responsibility to the U.S. Army Military Construction Program,[106] and in 1979 to Defense Agency for Military Construction.

The 1968 transfer from MAP to the U.S. Army Military Construction Program reflected a shift in focus, on the part of the U.S., that had taken place earlier in the 60's. This shift was away from the initial U.S. policy objective of providing grant aid, through common financing, for the installations required to support the military end items being furnished to its European allies under MAP.[107] Infrastructure had also been supported as a device for integrated facilities planning, and for providing for common projects that cross borders. Later, as the economic recovery of Europe became a reality in the later 1950's U.S. Policy objectives changed. Since then U.S. Policy objectives have included:

- inclusion of a maximum number of U.S. Projects in the program;

- maximum NATO common funding of facilities required by U.S. forces in the European NATO area;

- maximum NATO common funding of certain costs of U.S. relocation from France, without regard for normal Infrastructure funding criteria (as agreed by the DPC in December 1968 for some $104 million);

- continuation and strengthening of integrated facilities planning, and;

- construction of essential facilities for common use.

2. Congressional Authorization and Approval—Multi-year Budgeting

The following exchange between the Director of the U.S. Mission's Infrastructure and Logistics Division, Mr. T.J. Loveland, and a Senator during Senate Subcommittee Hearings on the subject area in 1977 captures the fundamental ambiguity of the funding status of all allied collaboration for defense procurement, as well as problems involved in multi-year budgeting.

Senator Sasser: Since the content of the approved NATO program has been determined within NATO and the executive branch, what would be the impact if congress refused authorization or appropriation of the amount estimated to be obligated in a given year? I guess the corollary to that question is, does the U.S. actually have that discretion?

Mr. Loveland: Do we have the discretion to refuse funding?

Senator Sasser: That is right.

Mr. Loveland: The executive branch approval of a specific ceiling for a 5-year period is taken with full knowledge of the appropriate Senate and House Committees, the chairmen of which are informed of the on-going U.S. position as well as the resulting agreement. All agreements are made on the specific understanding that they are subject to

STATUS OF INFRASTRUCTURE AUTHORIZATIONS BY CATEGORY ($000)

	AUTHORIZATIONS DURING			U.S. SHARE DURING		
	FY 84 ACTUAL (1)	FY 85 (EST) (2)	FY 86 (EST) (3)	FY 84 ACTUAL (4)	FY 85 (EST) (5)	FY 86 (EST (6)
BY CATEGORY						
AIRFIELDS	127,002	267,853	267,853	34,824	73,448	73,448
COMMUNICATIONS	61,459	155,538	155,538	16,852	42,650	42,650
WAR HQS	77,710	145,860	145,810	21,308	39,985	39,983
POL FACILITIES	32,969	64,655	64,651	9,040	17,729	17,728
NAVAL (FLEET) FACS	29,807	89,343	89,343	8,173	24,499	24,499
WARNING INSTALLATIONS	40,962	117,202	117,202	11,232	32,138	32,138
TRAINING INST	6,353	10,977	10,984	1,742	3,010	3,012
SAM SITES	9,774	31,056	31,063	2,680	8,516	8,518
SSM SITES	–	–	–	–	–	–
US/						
FORWARD ST STS/MISC	112,814	165,853	165,884	30,934	45,378	45,376
SPECIAL INTEREST PROJECTS	25,624	43,919	43,922	7,026	12,144	12,143
REINFORCEMENT SUP. CAT.	1,284	1,835	1,841	352	503	505
TOTAL	525,758	1,094,091	1,094,091	144,163	300,000	300,000

Source: OASD(ISP)

ANNUAL INFRASTRUCTURE REQUESTS, AUTHORIZATIONS, AND APPROPRIATIONS VERSUS FUNDING REQUIREMENT

($ IN THOUSANDS)

FISCAL YEAR	REQUESTED	AUTHORIZED	APPROPRIATED	OBLIGATED
1968	$60,000	$60,000	$37,500	$30,558
1969	55,000	55,000	47,000	44,304
1970	50,000	50,000	34,000	28,241
1971	50,000	41,500	33,500	56,057
1972	20,000	15,000	14,000	44,085
1973	58,000	58,000	38,000	74,505
1974	80,000	80,000	40,000	87,364
1975	88,000	84,000	69,000	55,967
1976	80,000	80,000	71,000	71,060
1976T	20,000	20,000	20,000	43,388
1977	80,000	80,000	80,000	90,680
1978	85,000	85,000	85,000	95,728
1979	90,000	166,300	166,300	158,426
1980	150,000	224,900	184,900	250,681
1981	300,000	300,000	250,000	319,531
1982	345,000	345,000	345,000	276,070
1983	375,000	375,000	325,000	258,801
1984	150,000	150,000	50,000	144,164
1985	296,700	131,700	107,200	250,000 (EST)

NOTE: Effective with the 1979 legislation, NATO Infrastructure was transferred from the U.S. Army Military Construction Program to the Defense Agencies, Military Construction Program. 1982 Legislation established a new Title 5 under MILCON for Infrastructure.

Source: OASD(ISP)

> the authorization and appropriation of funds by Congress. Failure to provide the funds would, however, be regarded by our allies as withdrawal of U.S. support for this visible NATO program of cooperation and allied cohesion. Refusal by the United States to fund the program would predictably sound its death knell."[108]

3. Responsibilities within the DoD

Within the DoD, the Assistant Secretary for International Security Affairs (ISA), the Assistant Secretary for Manpower, Reserve Affairs and Logistics (MRA&L), the Comptroller and the Joint Chiefs of Staff (JCS) are all responsible for providing comments and recommendations on the proposed program. In late June or early July, the U.S. European Command's (USEUCOM) Infrastructure Review Board meets to review and prepare its comments on the proposed program, then forwarding them to the JCS. Comments are also solicited from the Departments of State and Commerce and the Treasury. The U.S. position is developed through the coordination, by the Secretary of Defense, of the comments of all these elements. In August, the U.S. position is transmitted to SACEUR and SACLANT for discussion at the annual Infrastructure conference in September prior to the final consideration of the annual slice by the NATO Infrastructure Committee and final approval a year later by the NAC.

The responsibilities for NATO common infrastructure matters within the DoD were delineated in a DoD directive dated October 4, 1976, entitled "DoD Participation in the NATO Infrastructure Program," DoD Directive 2010.5.[109]

This directive assigns to the Assistant Secretary of Defense (International Security Affairs) (ASD(ISA)) responsibility for providing policy direction,

coordination, and monitoring of DoD participation in NATO Infrastructure Programs.

The Assistant Secretary of Defense (Installations and Logistics) (which now translates to ASD Manpower, Reserve Affairs and Logistics, ASD (MRA&L)) has responsibility for reviewing the Military Construction Program (MCP), equipment/materiel procurement programs, and projects within the NATO Infrastructure Program with the objective of providing military facilities or equipment/materiel, required by U.S. Forces committed to NATO, through NATO funding whenever feasible.

The Assistant Secretary of Defense (Comptroller) is assigned responsibility for establishing, review, and coordinating U.S. fiscal policies concerning procedures and reporting relating to NATO Infrastructure, including NATO funding, prefinancing, recoupment of U.S. funds, and impact on the balance of payments.

The Joint Chiefs of Staff are to review, from a military requirements standpoint, all projects proposed for NATO Infrastructure financing, which includes (1) providing guidance to the U.S. Representative to NATO's Military Committee, and the U.S. military commanders; (2) providing recommendations to the Secretary of Defense on annual slice programs and related matters; and (3) conducting a review of standards and criteria for NATO projects.

The secretaries of the military departments are required to issue directives regarding the detailed responsibilities of their major commands in the European area under the NATO Infrastructure program, and also to review military construction projects to insure that all projects potentially eligible for cost sharing are submitted to NATO.

USEUCOM maintains liaison with its component commands—USAFE, USAREUR, and USNAVEUR—and the U.S. Mission to NATO. USEUCOM issues periodic directives to the component commands regarding NATO Infrastructure responsibilities and informs the commands when action affecting the claims submitted are taken by NATO.

USEUCOM also keeps its component commands informed regarding changes in NATO eligibility criteria for NATO Infrastructure projects, maintains records of NATO Infrastucture claims submitted by the component commands, and informs the commands when NATO has authorized payment on these claims.

The component commands are responsible for making the initial determination of whether construction projects are eligible for common funding, submitting various types of claims documents to the host country for submission to NATO, satisfying the documentation requirements of NATO to insure that claims will be approved, and recovering funds from the host country after NATO has authorized payment to the United States.

The U.S. Mission to NATO provides U.S. representation on the Infrastructure Committee and the P&P Committee, (as well as the rest of the 20-odd NATO standing committees), evaluates NATO Infrastructure policies and procedures, and recommends U.S. positions for consideration by the Department of Defense and the Department of State. These functions include:

1. Preparation of budget estimates to pay the U.S. contributory share of the Infrastructure Program.

2. Maintenance of accounts for credits received from NATO Infrastructure funding.

3. Provision of assistance as required at congressional hearings.

4. Coordination with commanders of Unified Commands to obtain information required for the processing of programming and authorization documents.

5. Coordination with the Naval Facilities Engineering Command regarding projects for which the United States acts as host nation.

The annual contribution of the U.S. to its share of expenditures for common Infrastructure begins with the estimate of the U.S. Mission. The U.S. Mission forwards this estimate to the Department of the Army, which produces the final amount to be included under the heading of the U.S. Defense Agnecies -Military Construction Program[110]—in the budget presented to Congress for authorization

and appropriation. As the NATO Infrastructure Payments & Progress Committee authorizes initiation of construction, the U.S. obligates funds from these annual appropriations for its share of financing. The Comptroller of the U.S. Army Support Group in Europe quarterly settles accounts, paying the host countries for the various projects.

4. Recent Legislation

In October 1979, Congress enacted PL 96-92, the International Security Assistance Act of 1979, which authorizes the President to provide quality assurance, inspection, and contract audit services without charge for defense articles and services on behalf of any reciprocating NATO member government or for contracts awarded under the NATO Infrastructure Program. The pertinent language with regards to the NATO Infrastructure Program reads:

> In connection with the placement or administration of any contract or subcontract for defense articles or defense services pursuant to the NATO Infrastructure Program in accordance with an agreement under which the foreign governments participating in such program provide such services, without charge, in connection with similar contracts or sub-contract.

Not only does this act improve the political atmosphere (the U.S. have been the only NATO member not providing these services without cost), but it assists U.S. contractors in that they will no longer be hampered by inability to include this type of service in their bids for Infrastructure contracts--something that foreign firms have always been able to do.[111]

5. Improvement of the U.S. Position vis-a-vis Both Cost and Benefits

The primary purpose of national delegates, including the U.S. Mission, in the Infrastructure Committee and the P&P Committee is to serve the military requirements of the Alliance in a cost effective manner. This means that, in practice, each of the national delegations serves as advocate for, in ascending order of importance: the interests of its national industry; those of its national treasury; and the legitimate aspirations of its NATO committed forces for facilities supporting defense of the Alliance. The latter two of these concerns are treated here as they regard the U.S., while the next chapter is devoted to the first one, industry.

The U.S. has achieved considerable success in implementing its policies vis-a-vis the NATO Infrastructure Program in shifting away from a military assistance orientation of the 50's toward using the NATO Infrastructure Program to support the requirements of the U.S. forces in Europe. This has involved several special programs that have, on the one hand, increased the non-U.S. effective share of funding, (hence the difference between the official and effective U.S. share), while on the other, have also increased the coverage of U.S. needs in meeting its military commitment to NATO.

In 1968, the DPC agreed on a special one-time provision of a $100 million dollars of Infrastructure funds for costs associated with the relocation of U.S. and Canadian forces from France to be included in the next five-year Program, Slices XXI-XXV. This agreement stipulated however, that NATO's payment constituted purchase of a part of the U.S./Canadian claim against France,

for the loss of bases in France. Thus any eventual payment by France would be divided between NATO and the U.S. in proportion to NATO's contribution to that of the entire U.S./Canadian cost of relocation (estimated at about 36%). Subsequent to this, in 1975, the U.S. and France finally agreed to settle the claim for $100 million to be paid in equal installments over a five year period. In June, 1975, France paid the U.S. the first $20 million, and the U.S. deposited NATO's share of some $7.2 million to a NATO account in Brussels. This process has been repeated in the years since, with the last payment having been made in June, 1979.[112] NATO has used its $36 million share to augment its limited Infrastructure Program funds, helping somewhat to offset the effects of inflation.[113]

In 1970, the Eurogroup[114] created the European Defense Improvement Program (EDIP) of some IAU 150 million (which came to approximately 1/2 a billion dollars), primarily to counteract U.S. executive and congressional pressure back by a possible reduction of the U.S. forces in Europe, with a tangible demonstration to the U.S. that Europe was willing to assume its share of the defense burden.[115] Secondarily, the initiative was to display Western European solidarity and resolve to defend itself in the wake of the Soviet 1968 invasion of Czechoslovakia. Although EDIP was a financing pledge by only 10 NATO members instead of the usual 13 for Infrastructure, it was within the framework of NATO Infrastructure and helped reduce the effective U.S. contribution to some 20% for Slices XXI-XXV. EDIP inter alia, allowed for faster recoupment for the U.S. of those funds previously expended through the pre-financing procedures on aircraft shelters.

EDIP was originally intended to add some $200 million to the financing of the Aircraft Survival Measures (ASM)[116] and some $300 million for the first phase of the NATO Integrated Communications System (NICS), but due to the ASM program's cost, funds were used solely for ASM.

For the total amount to be programmed for the following five-year program, Slices XXVI-XXX, the U.S. pushed for a figure of $2 billion, which it felt was absolutely necessary in order to maintain NATO's defense posture, i.e., while still adequately covering those common user and national forces projects supported by the U.S. On this first point, the financial difficulties of two allied nations limited the agreement on total funding to only $1.35 billion - less than 2/3 of the required sum. However, this difference was made up several years later, thus avoiding the exhaustion of funds before Slice XXX. On the second point, the European participants have assumed a greater percentage of funding of infrastructure projects through special programs, which have also involved a further expansion of the scope of the existing Infrastructure criteria to more fully provide for the facilities required to support the considerable U.S. commitment to Europe. Since the late 60's the U.S had continued to obtain about half of those funds allocated for national user projects. This has in good part been due to the continuation of the precedent created by EDIP and by a similar program which was set up for the following five-year program (1975-1979). This one was called the U.S. Special Program and funded projects supporting U.S. forces stationed in Europe which, though similar to normal Infrastructure criteria, would normally be ineligible. This includes such categories as: warehouses and logistics support facilities, but

also increases in the percentage of the NATO Infrastructure Program's partial funding of projects. For example, NATO criteria states that Infrastructure funds can cover only a certain percent of aircraft shelters, but the U.S. used some of this additional $140 million towards the remaining percentage, thus saving U.S. funds for other Projects. As a consequence, although the U.S. Mission only managed to get the official U.S. share down to 27.23% in 1974, instead of the 20% requested by Congress -primarily because this would have left the FRG as the largest official contributor - they were able to hold it to an effective share of 21.56%, a very small increase over the "effective" share of 20% in the previous period.[117]

In the late 70's the U.S. succeeded in further expanding the scope of the existing criteria to include controlled humidity storage which maintains in good condition equipment of dual based U.S. forces (see the following section covering the RSC). Another area where the U.S. has recently been successful, is obtaining NATO approval of a revision of criteria for nuclear storage security improvements. While awaiting eligibility, the U.S. had prefinanced some $100 million in improvements in this latter category.

In conclusion, although the declining U.S. share of funding has been countered somewhat in absolute terms by a depreciating dollar and inflation, improved implementation procedures and the alternative of pre-financing, plus the fact that recent slices have provided an increasing proportion of projects in support of U.S. forces, would lead one to the conclusion that U.S. interests are being well served through the NATO Infrastructure Program.

6. The Rapid Reinforcement Program (RRP) and NATO Infrastructure Program Funding

The U.S. has recently obtained agreement of the European participants to expand eligibility criteria for support facilities under NATO Infrastructure rules through the creation of a 14th project category, the Reinforcement Support Category (RSC). The RRP is the emergency build-up plan designed to more than double U.S. ground forces in Europe within two weeks (through POMCUS),[118] and triple the number of tactical aircraft by increasing the number of collocated operating bases (COB's). The permanent representatives accepted the agreement in January, 1979, and the Ministers nailed it down at the May meeting of the NAC/DPC. As of January, 1980, the NATO Infrastructure Committee was programming projects to implement the agreement, while the U.S. continued to push for increased NATO funding for the RSC.

On this latter point on October 16, 1979, Aerospace Daily reported that the adviser to the Secretary of Defense on NATO affairs, Robert W. Komer,[119] had warned European members of the Alliance that they would still have to step up funding and commit more logistical resources to make NATO's rapid reinforcement plan work. The U.S., said Komer, "is spending billions today" on the RRP while its European allies have been "reluctant" partners in providing NATO Infrastructure Program funding, and were moving slowly to offer logistical support. Quoting from the article, Komer continued:

> Given the current snail's pace at which the necessary details are being worked out, I pray that we don't have to meet an emergency before 1988.

> To make rapid reinforcement effective, European allies will have to provide storage sites and warehouses for prepositioned equipment, collocated operating bases for air squadrons, and depots to store much more ammunition. Most of this can be funded via the NATO Infrastructure Program, in which the U.S. pays the largest single share. But it will take much higher infrastructure funding than our reluctant allies agree to provide in the new 1980-84 slice approved last December in Brussels. If there was ever a better bargain for our allies, I'd like to see it.
>
> The U.S. cannot simultaneously deploy massive forces and logistical support and will have to rely on European allies to back them up. The U.S. is looking for the same mobilized civilian resources that a host nation can count on to support its own forces: airlift and sealift; port and airfield reception and unloading; transport forward to the battle area; depot, construction and medical facilities; fuel storage; and tank trucks--all vital to our ability to fight.

Komer said it sounded as if the U.S. were asking for a lot, but only a "modest fraction" of the enormous civil resources and infrastructure in Europe's highly developed economies would be needed. He said that within two weeks after the decision to reinforce is taken, the U.S. plans to have in Europe more firepower than the entire German army, Europe's strongest ground force, and air squadrons that would double the number of the entire RAF or Luftwaffe.

> In short, America has proposed a transatlantic bargain to its European partners. We'll deploy rapidly massive combat reinforcements if you'll help provide the European facilities and host nation support to enable us to do so. If you don't we can't, he added.

[1]Lt. Col. George F. Francis, NATO Infrastructure: Is There a Better Way?, Air War College, Maxwell Air Force Base, Alabama, 1976, pp. 14-17

[2]At the Heads of Government meeting of the North Atlantic Council (NAC) in December, 1957 (following the Sputnik shock) a number of significant initiatives were taken of long-term significance to NATO history. One of these was the U.S. initiative to launch several multinational missile production programs in Europe (i.e., Hawk, Sidewinder, and Bullpup—all treated in Chapter 7). Another was the NAC decision to accept the U.S. offer of establishing stocks of nuclear weapons in Europe. The United States provided tactical bombs and warheads that would be turned over to Europeans in case of war. But these weapons had to remain in U.S. custody until released by Presidential directive. A system was set up, known as Special Ammunition Storage, under which small American detachments guard these weapons and keep them prepared for immediate use. The European allies agreed to help defray the cost of keeping custodial detachments scattered through Europe by building the storage compounds with NATO Infrastructure Program funds. Significantly, they also agreed to provide barracks for custodial personnel—the first time that troop accommodations had been charged to the infrastructure account. The recurring costs of the host country of fulfilling its commitment to guard these sites and to provide other services for them, such as transportation, far exceed the one-time cost of site construction. Technical developments such as electronic locking devices operated by remote control (Permissive Action Links) have since made it possible to exert American custodial control with fewer people and facilities. (Brigadier General E. Vandevanter, Jr., USAF

(Ret.) Common Funding in NATO, The Rand Corporation, Santa Monica, Calif., June, 1967, p. 46.)

[3]The NATO Infrastructure Program will pick up about 200 million dollars in deployment and maintenance costs of the follow-on Pershing II and Ground Launched Cruise Missiles (GLCM) to be deployed in Europe (U.S. operated) in the mid-1980's.

[4]The goal of this effort is to be able to double U.S. troop strength and triple U.S. fighter strength in Europe within a two week period, if need be.

[5]NATO: Facts and Figures, NATO, Brussels, p. 150

[6]Slice VIIa was devoted entirely to work to be carried out in the FRG, which had just joined the Alliance. The FRG financed 50% of this slice.

[7]NATO: Facts and Figures, op. cit., pp. 150-151

[8]Ibid., p. 151

[9]Ibid.

[10]Ibid.

[11]DOD Directive 2010.5, "DOD Participation in the NATO Infrastructure Program" August 31, 1966, Page 3

[12]NATO: Facts and Figures, op. cit., p. 151

[13]EDIP, undertaken by NATO's Eurogroup (European members minus Iceland and France) was also originally intended to finance the first phase of the NATO Integrated Communications System (NICS), but in view of the extent of the ASM program, EDIP could not finance the NICS program.

[14]With the devaluation of the pound in November 1967, NATO switched over to IAU's (Infrastructure Accounting Units) based on the pounds pre-1967 rate.

[15]Joseph Miller, International Security Assistance, Office of Secretary of Defense, Statement to House Armed Services Committee, Hearings No. 95-7, 1977, p. 224

[16]T. J. Loveland, Director Infrastructure and Logistics Division, U.S. Mission to NATO, interview with the author, June, 1978

[17](As of the second half of 1979 one IAU was valued at $4.574), so this five year program will involve at least 4-1/2 billion dollars.

[18]T. J. Loveland, letter to the author dated Oct. 17, 1979

[19]Ibid.

[20]Ibid.

[21]Ibid.

[22]Ibid.

[23]Ibid.

[24]Ibid.

[25]Vandevanter, op, cit., pp. 27-29

[26]Whereas the Infrastructure Committee was the cognizant authority for planning and approval, the Infrastructure Payments and Progress Committee is for the implementation stage.

[28]These rules adopted to ensure an effective control of NATO Infrastructure expenditure (this has to do with the ICB procedures, not the construction itself) have, more generally, made a considerable contribution to the solution of international procurement problems, and will be treated in greater detail in the latter part of this chapter.

[29]NATO Letter, June, 1959, p. 23

[30]Francis A. Beer, Integration and Disintegration in NATO: Processes of Alliance Cohesion and Prospects for Atlantic Community, Ohio State University Press, 1969, pp. 306-307

[31]Ibid.

[32]T. J. Loveland, Director of Infrastructure and Logistics, U.S. Mission to NATO, Statement before the U.S. Senate Appropriations Committee, Hearings on HR 7589, 1977, p. 313

[33]Francis, op. cit., pp. 51-52

[34]Vandevanter, op. cit., p. 79

[35]Ibid., p. 82

[36]T. J..Loveland, interview with the author, June, 1978

[37]The following chapter goes into these projects in some detail. U.S. industry has historically obtained around 50% of the work in these high technology projects.

[38]NATO-Wide's operation and maintenance costs are actually partially covered by the Civil Budget as well.

[39]Loveland, June, 1978, op. cit.

[40]Vandevanter, pp. 83-4

[41]Ibid.

[42]Loveland, June, 1978, op. cit.

[43]This was originally expected to involve the lease of reporting services from the system but no command and control relationship but now might involve a contribution in kind similar to the UK's.

[44]Representative of this on-going need for brick and mortar work is several hundred million dollars authorized over the last few years for an upgrading of allied airfields in Europe, to accommodate for wear and tear and to effectively support more complex aircraft..

[45]T. J. Loveland, the U.S. Mission's Director of the Infrastructure and Logistics Division, stated that, though the 30-35% sophisticated equipment figure varies from slice to slice, it has held true throughout the program, and even over each five-slice period, the 30-35% has come very close to being correct.

[46]NADGE - NATO Air Defense Ground Environment

NICS - NATO Integrated Communications System

[47]Although the contracts for the SATCOM II Satellite and Ground Station segments were originally awarded by SHAPE, as well as the case for SATCOM I contract administration was later transferred to NICSMA, but is not calculated in NICS production sharing.

[48]As we will see, there are exceptions to this rule for the relatively few large high technology projects.

[49]Major NATO Command.

[50]Some 800 plus Standardization Agreements (STANAG's) have been issued by the Military Agency for Standardization (MAS), an agency on the military side of NATO.

[51]These are implemented by the appropriate national authorities of the producer country.

[52]NAMSA monitors codification for NATO procurements, and although there is evidently room for improvement in this area, NATO obtains enough information on the sophisticated equipment it buys, to avoid dependence on a sole source for replacement.

[53]See Appendix for a copy of this clause.

[54]From interview with T.J. Loveland, June, 1978

[55]Ibid.

[56]Doing Business with NATO; AFCEA Symposium, April 10, 1979 Department of Commerce.Auditorium, Washington D.C., joint participation by Department of Commerce, Proceedings of Symposium presented by the Armed Forces Communications and Electronics Association, 5205 Leesburg Pide, Falls Church, Virginia 22041. The contents of the following pages are drawn primarily from the presentations of three of the nine speakers.

- T.J. Loveland, Director, Infrastructure Division, U.S. Mission to NATO—"NATO Procedures for Awarding Contracts and Funding Aspects"
- John Muller, U.S. Member to the NATO Infrasturcture Payments and Progress Committee, U.S. Mission to NATO—"Assistance to U.S. Industry for NATO Procurement"
- William Hayden, Director, Strategic/Industrial Production Sales, Major Products Division, Department of Commerce—"How U.S. Firms Become Involved in NATO Business." The above AFCEA sources symposium are supplemented by the author with Loveland and Muller in 1978 (in person) and between 1979 and 1984 (by telephone)

[57]Hayden, How U.S. Firms become involved in NATO Business, op. cit., p.71.

[58]Ibid, p.72.

[59]Ibid, p. 73.

[60]Ibid.

[61]Ibid, p. 74.

[62]Ibid.

[63]Ibid.

[64]Loveland, "NATO Procedures for Awarding Contracts and Funding Aspects," op. cit., p. 27.

[65]Ibid.

[66]Hayden, op. cit., p. 74.

[67]Ibid., p. 75.

[68] Mullen, "Assistance to U.S. Industry for NATO Procurement," op. cit., pp. 34-7.

[69] Ibid.

[70] Hayden, op. cit., p. 78.

[71] Loveland, (AFCEA), op. cit., p. 29.

[72] Ibid, p. 28.

[73] Ibid.

[74] Ibid., p. 27.

[75] Hayden, op. cit., p. 78.

[76] Loveland (AFCEA), op. cit., p. 28.

[77] Hayden, op. cit., p. 75.

[78] Ibid.

[79] Ibid.

[80] Ibid.

[81] Ibid., p. 76.

[82] Ibid.

[83] Ibid.

[84] Loveland, June, 1978 (interview), op. cit.

[85] Contractors are generally comfortable with the open procedure, although one NICSMA staff member mentioned a recent case where a dispute developed around the inability to get something changed which was in part due to a contractor's

[86]This advantage, though, was offset by the problems created by having transfered the dilemna to industry. The contractor had considerable difficulty with the 98% BOP stipulation, later on, during implementation. unwillingness to dialogue on a specification on anything other than a one-to-one basis with NICSMA for fear of compromising its competitive position.

[87]Hayden, op. cit., p. 78.

[88]Ibid.

[89]Ibid, p. 79.

[90]Loveland (AFCEA), op. cit., p. 29.

[91]Ibid, p. 30.

[92]Hayden, op. cit., p. 78.

[93]Ibid, p. 79.

[94]Loveland, op. cit., p. 31.

[95]Ibid.

[96]Mullen, op. cit., pp. 37-8.

[97]Ibid., pp. 38-9.

[98]Ibid., p. 40.

[99]'Country of origin' is the phrase used in AC/4-D/2261 (Final) in referring to the national government corresponding to a given national firm.

[100]For an example of one such dispute see the following chapter's treatment of the SATCOM III Ground Station Competition in 1978.

[101]See example of NATO Satcom III Ground Stations in Chapter 3.

[102]See Appendix for full procedure.

[103]U.S. Congress, House Report 89-2323, Investigation of U.S. Participation in the NATO Common Infrastructure Program, 45th report by Committee on Government Operations, October 19, 1966, p. 9.

[104]Beer, op. cit., pp. 180-1.

[105]The U.S. serves as host country not only for facilities constructed in U.S. territory but for those constructed in Iceland and Bermuda, as well.

[106]Francis, op. cit., p. 47.

[107]Ibid., p. 45.

[108]Hearings before the Subcom. on Military Construction Appropriations to consider H.R. 7589 (FY'78 appropriations for military construction programs). Feb. -April '77.

[109]See Appendix for a copy of DoD Directive 2010.5 for a more detailed explanation of responsibilities as well as policies and procedures.

[110]Prior to FY 1979 this was under the U.S. Army Military Construction Program

[111]DoD, Rationalization/Standardization within NATO, Sixth Report, 1980, a report to the U.S. Congress by Harold Brown, Secretary of Defense

[112]Miller, op. cit., p. 223.

[113]Prior to the NATO - U.S./Canada agreement (1968), or the U.S. - France agreement (1975), by early 1968, France had agreed to pay the U.S. approximately $13 million for military surplus material left behind at bases in France, when American troops withdrew. In addition France had agreed to purchase from NATO the former NATO headquarters facility near Paris for $17.5 million. As for Canada and France, they never reached an agreement. The status of the NATO-France negotiations, begun in the spring of 1968, are also quiescent, never having reached an agreement, even though basic agreements existed which called for negotiations between the host country and NATO to determine the "residual value" of facilities no longer used for NATO purpose. (Loveland, letter to the author November, 1977.)

[114]At that time, European NATO Member States except France, Iceland and Portugal; Portugal has since joined.

[115]At the same time the Eurogroup committed another $500 million to be spent over the same five year period generally beefing up existing forces.

[116]Until that time ASM was a priority NATO program upon which only the USAFE had acted. The initial USAF in Europe effort was completed in late 1970 and involved a four-pronged $77 million aircraft protection program that would theoretically give parked aircraft a 98% chance of survival from conventional attack. The total program consisted of not only shelters but, aircraft dispersal pavements, active missile and gun defenses and a camouflage "tone-down" effort. The initial USAFE project involved the construction of 360 shelters at six of its bases in the FRG, one base in the Netherlands, and one

in Italy. Another 54 shelters were built the following year, 1971, at two USAF bases in Turkey.

The $500 million in NATO Infrastructure funds resulting from EDIP were to fund up to 70% for shelters and dispersement pavements, while also providing some funding for protecting essential support facilities (e.g., operations buildings, petroleum storage, liquid oxygen plants and critical ground vehicles). The nations individually funded their own runway bomb damage (repair) capability, active defenses and camaflouge program. ("USAF Shelters for Aircraft in Europe Boost Survivability," Aviation Week & Space Technology, December, 1970, p. 25.)

[117]Loveland, October, 1979, op. cit.

[118]This translates to the prepositioning of the equipment for three additional US divisions in Europe. The equipment is naturally U.S. purchased, but the construction of the required storage facilities is funded by the NATO Infrastructure Program.

[119]Now under Secretary of Defense for Policy

Chapter 3

The NATO Infrastructure Program's C^3/I Projects

Integrated, or at least interoperable command, control, communications and intelligence (C^3/I) are absolutely central to Alliance conduct of coalition defense. Approval of NATO's Long-Term Defense Plan (LTDP) in May 1978 allowed the effort to get underway towards pulling the Alliance's diverse C^3/I projects together into a cohesive coordinated whole. Of the ten LTDP areas, one is devoted specifically to C^3, one has a large C^3 element - Air Defense, and for two areas C^3 constitutes a smaller but still significant element - maritime posture and electronic warfare. Of the Alliance's C^3/I projects, the majority are planned and implemented at the national level, but some are also carried out at the NATO level through the Infrastructure Program. In this chapter we are looking at those projects that fall into this latter category.[1]

Out of the NATO Infrastructure Program's commonly funded projects for Headquarters, airfields, naval bases, POL pipelines and storage facilities, communications, and early warning, has come the increasing need for integrating the ongoing operation, modernization, expansion, and the eventual replacement of the systems, once in place. Although the POL pipeline system was the first of the systems to assume an independent multinational identity within NATO for integrated management, it is in the area of C^3/I where this integration process has gone the farthest, involving multibillion dollar investments. Virtually all of

Source: NATO Information Service

The NATO SATCOM/Ground Terminal network procured by NICSMA

NATO Infrastructure Program's sophisticated equipment contracts fall into this category of C^3/I.

All of the projects treated in this chapter—ACE-High, the NATO SATCOM projects, NICS, and NADGE,—also fall within Mode #7 (U.S. led transatlantic industrial teams performing systems management and production tasks - with little or no joint development) which is treated in Chapter 12. Chapter 12 includes only the more recent weapon system projects, which fall into Mode #7 HELIP (European Improved Hawk) and the F-16, plus the NATO Airborne Early Warning and Control (AEW&C) E-3A project.

A. NATO COMMUNICATIONS

1. Introduction

NATO's communications programs have been the second largest recipient of Infrastructure funds after airfields, totaling almost a half billion dollars during the 1950's, tapering off in the early 60's with the completion of ACE-High and the beginning of NADGE, and picking up again in the early 70's with SATCOM II and NICS. As of 1980, commonly funded NATO communications expenditure totaled well in excess of one billion dollars (in then-year dollars, that is).

The Infrastructure Program, during the 1950's had established a carefully planned communications network that extended throughout Western Europe, providing the military circuits which SHAPE would require in wartime. Although

these systems were planned and paid for through the NATO Infrastructure Program, the national PTT systems contracted for and managed the actual construction, and integrated the circuits into their civil systems. The cost of constructing this network of communications facilities came to 125 million pounds sterling, including supporting high frequency radio links and submarine cables filling gaps in the Mediterranean area. It was about 90% complete by the spring of 1957.[2] However, due to the exposure of these circuits to sabotage and strikes, and the time necessary for SHAPE to call civil circuits into military use (varying from an hour or so for the highest priority, to several days for circuits of lower priority) the system was not entirely adequate for SHAPE's needs. In order to effectively deal with an emergency, it was recognized that NATO needed a back-up system owned, operated, and protected by SHAPE, to complement the civil network used for day-to-day operations.[3]

2. ACE-High

In fulfilling its responsibility as coordinator of Air Defense of NATO Europe, SACEUR set about developing an appropriate communications system that would provide for the rapid and secure dissemination of information.[4] In 1955 the U.S. agreed to release the necessary know-how to NATO for use by SHAPE. This led to the initiation of the $75 million project, ACE-High.[5] ACE-High is a Forward Scatter communication system based on beaming high frequency signals up to either the troposphere or ionosphere layers of the atmosphere, with a small portion of the scattered signals reflected back to earth, being picked up by super-sensitive receivers and then beamed on by the same means.[6] Both Generals

Gruenther (SACEUR, 1953-1956) and Norstad (SACEUR, 1956-1963) consistently provided strong support for the proposed creation of a communication system based on troposphere and ionosphere scatter principles.

Under the supervision of the SHAPE Air Defense Technical Center (SADTC),[7] located in The Hague, Netherlands, a pilot project was begun in Norway—unilaterally financed by the U.S., and costing $5.3 million. This sector of what was to become ACE-High, was known as Project Hot Line and was completed in March 1958. The work was engineered by ITT, which also installed the over-the-horizon (O/H) equipment. Norway, as the host nation, provided the land for the sites, and the operating personnel, at its own expense. The U.S. also financed another Forward Scatter system in the South, called Double Jump, that was completed in May, 1958, at a cost of $4.3 million. Since this project was rushed through as a stop gap measure, it utilized the quicker-to-install ionoscatter equipment, whereas Project Hot Line had troposcatter equipment.[8]

After the completion of these two unilaterally funded sections, work on the commonly funded main portion of the system began later in the same year. Since this was still during the period of American largesse vis-a-vis NATO, the U.S. contribution of $9.6 million for the two above segments was in addition to its normal NATO Infrastructure Program funding share for the construction of $75 million ACE-High project.

For the ACE-High system, SHAPE received the status of a "16th host nation" from the North Atlantic Council representing a precedent in the NATO Infrastructure

Program. This meant that instead of the usual procedure of contracting authority being an agency of a national government, it would be SHAPE itself. SHAPE was also to be responsible for the maintenance and operation of the sites as is inherent in host country status. The operation and maintenance of the system is funded by NATO's Military Budget, as are a limited number of other facilities originally constructed through the NATO Infrastructure funding, certain Early Warning stations and a percentage of the NADGE system.[9]

The principal contractor for the system was International Standard Engineering Inc. (ISEI), a wholly owned subsidiary of ITT established for the project under French law and located in Paris. ISEI acted as prime contractor for system engineering, site surveys, installation of equipment, testing the network and training military personnel for operation and maintenance. ISEI staff consisted of individuals from ten different nations that remained under the administrative control of their parent companies, eight of which were European, one Canadian, and three U.S.

SHAPE directly undertook all equipment procurement itself through NATO Infrastructure's International Competitive Bidding procedures. SHAPE procured the equipment itself so that no firms of any nation would have an unfair advantage, and thereby insulating the project against the usual recriminations that would have followed, especially for such a major high technology project. Having beenawarded the prime engineering contract, ISEI was specifically excluded from

preparation of the equipment specifications, only reviewing them to ensure compatibility with the overall system. Nine manufacturers in six nations, on both sides of the Atlantic furnished the major items of equipment.[10]

The national Ministries of Defense of the nations within which facilities are located were responsible for site preparation (which is the norm for NATO Infrastructure Program funded projects). This included the construction of buildings, provision of the power supply, the line-of-site antenna towers, O/H antenna foundations and the access roads. In addition, the MOD's, assisted by ITT system companies, drew up the site specifications, surveyed and laid out the site, and made the final inspection for SHAPE.

On the whole, ITT's being a Multinational Corporation was advantageous in coordinating such a multinational effort. Even so, ITT system companies were not under the control of ISEI. The engineers staffing ISEI, as well, remained under the administrative control of their parent companies with their widely differing policies. Further complicating administration was the considerable government regulation of worker's welfare, and even of management prerogatives, that is common to European firms. As such, even though this project, for the most part was one managed by a multinational corporation, it resembled in some aspects a consortium effort.[11]

Besides the seven ITT subsidiary or associated companies involved in electronic equipment installation, for the supply and installation of the O/H antenna, SHAPE had a contract with ITE Circuit Breaker Company, of Philadelphia, which in

turn subcontracted the production and erection of the main antenna structures themselves to the German firm, Krupp. For the assembly and erection of these O/H antennas, ITT system personnel were also involved, as surveillants for SHAPE.[12]

According to Kenneth Zitzman, Executive Vice President of ITT's ISEI complications arose in the following areas:

- frequency clearances and coordination between adjacent nations;[13]

- though exempt from customs payments, as would be any NATO Infrastructure project, special procedures for clearance and implementation of the project still had to be worked out in accordance with each contry's national law. This has since become less of a problem for NATO Infrastructure projects, but ACE-High occurred during the early years of NATO Infrastructure and represented a project unprecented in scope.

- obtaining uniform power supplies which meet specifications. Since these were furnished by each of the nine nations in which stations were located with each national government selecting its own source - (with the exception of one or two cases) they naturally obtained them from domestic firms;

- distance between station sites and manufacturers;

- the usual language differences involving documents, texts and technical courses;[14]

- the normal NATO requirement for unanimity on project approval and funding;

- problems arising from several month delays in getting the security clearances required for access to many sites. Many subcontractors hired men for the ACE-High project but had to wait two to three months to use them, while national security clearances went through.[15]

Zitzman's major recommendation to the military authorities was "...I suggest that you recognize these unusual problems in your planning and realize that your contractors will encounter delays far beyond their responsibility and be forced to make compromises which cannot be avoided."[16] The system was originally expected to be virtually complete and in operational use by mid-1962. However, the last station in the ACE-High communications network was not accepted by SHAPE until late 1963.

This project also involved one additional precedent in NATO contracting. A post contract award dispute developed between SHAPE and one of the contractors, REL—a U.S. firm providing the multiplex equipment. The dispute dragged on for years finally reaching a settlement in 1970 through arbitration. A sum of about 1 million pounds sterling was paid to REL.

With its completion in late 1963, ACE High was the most expensive item of community (i.e. NATO) held property, as well as being the largest communications system ever planned, engineered, installed, and placed in operation under an internationally funded project.[17] The system was approximately three times as large as Project White Alice in Alaska. It included some 86 stations located in nine nations: the UK, the FRG, France, Italy, Greece, Turkey, Norway, Denmark, and the Netherlands. After the system was in place, General Norstad (SACEUR) emphasized that, in the future, the area of command, control, and communications would continue to preoccupy NATO—which it has.

Responsibility for procurement and supply of spare parts for the ACE-High system fell to the NATO Maintenance and Supply Agency (NAMSA) in Luxembourg.

When, in March 1966 France withdrew its armed forces from the NATO integrated military command, preparations were begun for the relocation of NATO and SHAPE facilities from Paris to Belgium. SHAPE initiated a crash program to add several links to the ACE-High system before the April, 1967, deadline for the transfer of military operations. Another major addition to ACE-High was made in 1969 when a project was implemented to provide an alternative route for the NATO communication link to Southern Europe, involving four new troposcatter links. During the period that these two additions to the ACE-High system were being implemented, SHAPE also increased the capacity of the equipment on the more heavily used mainline segments of the system.[18]

In the late 70's, following a joint US--NATO study on selected interconnection of the ACE-High tropospheric scatter system and the US Defense Communication System, nine of twelve near collacated sites were interconnected at virtually no cost to the US or NATO, with considerable benefit to both through improved reliability, survivability, and flexibility. The three remaining sites required microwave links at an estimated cost of some $600,000. The NATO Military Authorities requested this amount; but NATO deferred the program in favor of higher priority projects, resulting in delay in interconnection of the three remaining sites. The US has continued to support efforts to reinstate this funding.[19]

3. NATO-Wide

Another important project in NATO communication, but on the political side, is the NATO-Wide telegraphic communication center located at NATO's Brussel's Headquarters. This system, first operational in 1969, is the hub of a communications network linking the Situation Center with the NATO capitals and major military commands. NATO-Wide is an important asset in NATO's crisis management role, ensuring quick and secure consultation, between ministries and commanders.[20] SHAPE served as host country for the construction of NATO-Wide, awarding the contract to Marconi (UK).

4. SHAPE's Regional Command Centers

NATO is also continually expanding and improving the widely dispersed regional military command centers. For these projects involving a great variety of equipment, SHAPE often contracts with an independent systems manager to carry them out as it did with ACE-High. So as to avoid the inevitable concern any manufacturer has for his own equipment interests, or the competitive operating constraints required when one manufacturer deals with another, an engineering and systems management firm is given the responsibility of bringing together in one project the equipment and experience of a number of otherwise competitive manufacturers.[21]

One firm that has been very successful in involving itself in a great deal of work on NATO's regional military command center projects (as well as other of NATO's C^3 projects) has been Page Europa, S./A. the European branch of Page Engineering of Washington, D.C., a subsidiary of Northrop. Page Europa, based in Italy (and therefore counted as an Italian firm for BOP purposes), has been involved as systems engineer and has captured a considerable portion of NATO's high technology work, as either part of a consortium effort or occasionally accomplishing the whole job themselves.

5. The NATO Integrated Communications System (NICS)

a. The System

By the late 1960's, it was apparent that NATO's three principal and separate communications systems, the military ACE-High, the political NATO-Wide, and the recently initiated SATCOM system would only partially fulfill the alliance's needs during the latter third of the century. This need of the Allied Command Europe (ACE) for a secure, rapid, flexible and survivable integrated communcations system was originally recognized in a proposal developed by the SHAPE Technical Center (The Hague, Netherlands). As previously mentioned, NATO's communications were at that time still highly dependent on the national PTT's for day-to-day operations, with the only NATO-owned and operated backup on the military side being the ACE-High system.[22]

Further studies promoted by Secretary of Defense McNamara led in 1968-69 to the recognition of NATO's need for an improved communications system, if it was to carry out its political and military crisis management functions. Therefore, the Supreme Allied Commander Europe (SACEUR) was invited to prepare a plan which would be based on the implementation of an integrated, meshed-grid network providing greater routing flexibility and survivability, through automatic telegraph and telephone switching which makes use of all suitable transmission systems and equipment. Consequently, at the Defense Planning Committee (DPC, NATO's Defense Ministers) meeting of November 1970, it was agreed that NATO communications would be integrated into one system.[23]

The completed network will be a survivable, common-user, switched voice/teletype data system which will absorb or replace most of the current NATO-funded communications systems i.e. NATO funded PTT systems, ACE-High, NATO-Wide.[24] The NICS will connect the NATO Headquarters in Brussels, NATO commanders' headquarters down to the Principal Subordinate Commands and the NATO national-capitals for essential command and control, political consultation, intelligence exchange and messages concerning nuclear weapons employment.

The mature NICS Stage II will be redundant for survivability, will have facilities in all NATO nations, and will be centrally managed and controlled by NATO international personnel. Stage I will be completed about 1983 at a cost of more than 500 million dollars. The entire system, including Stage II, is scheduled for completion in the mid-1990s. The cost of NICS Stage I and Stage II together is expected to approach $1.5 billion.

b. <u>NICSO —The NJCEC and NICSMA</u>

In May 1971, an NPLO, the NATO Integrated Communications Systems Organization (NICSO) was established, its NPLO charter, <u>Document C-M(71)19</u>[25] having been approved by the North Atlantic Council two months earlier. The NATO Joint Communications-Electronics Committee (NJCEC), one of NATO's 20 odd permanent committees assumed the additional function of NICSO's Policy Committee. The NJCEC a committee antedating NICSO, was the senior advisory body to NAC and DPC on overall NATO communications-electronic policy, having responsibility for ensuring that NATO civil and political requirements are coordinated with the

military requirements. NICSO's executive arm is the NICS Management Agency (NICSMA).

NICSMA is headed by a Director General, assisted by a Deputy, both being appointed by the Secretary General on recommendation by the Policy Committee, and after consultation with the Chairman of the Military Committee. Once organized, NICSMA set out to plan and implement on a progressive and evolutionary basis a NATO Integrated Communications System. NICSMA's responsibilities involve system planning, design engineering, preparation of technical specifications, negotiation and award of contracts, installation testing, acceptance, and the handing over of the operational system to the user. From that point on NICSMA still maintains overall operational cognizance of the system including the proper interface with other NICS and national communications systems.

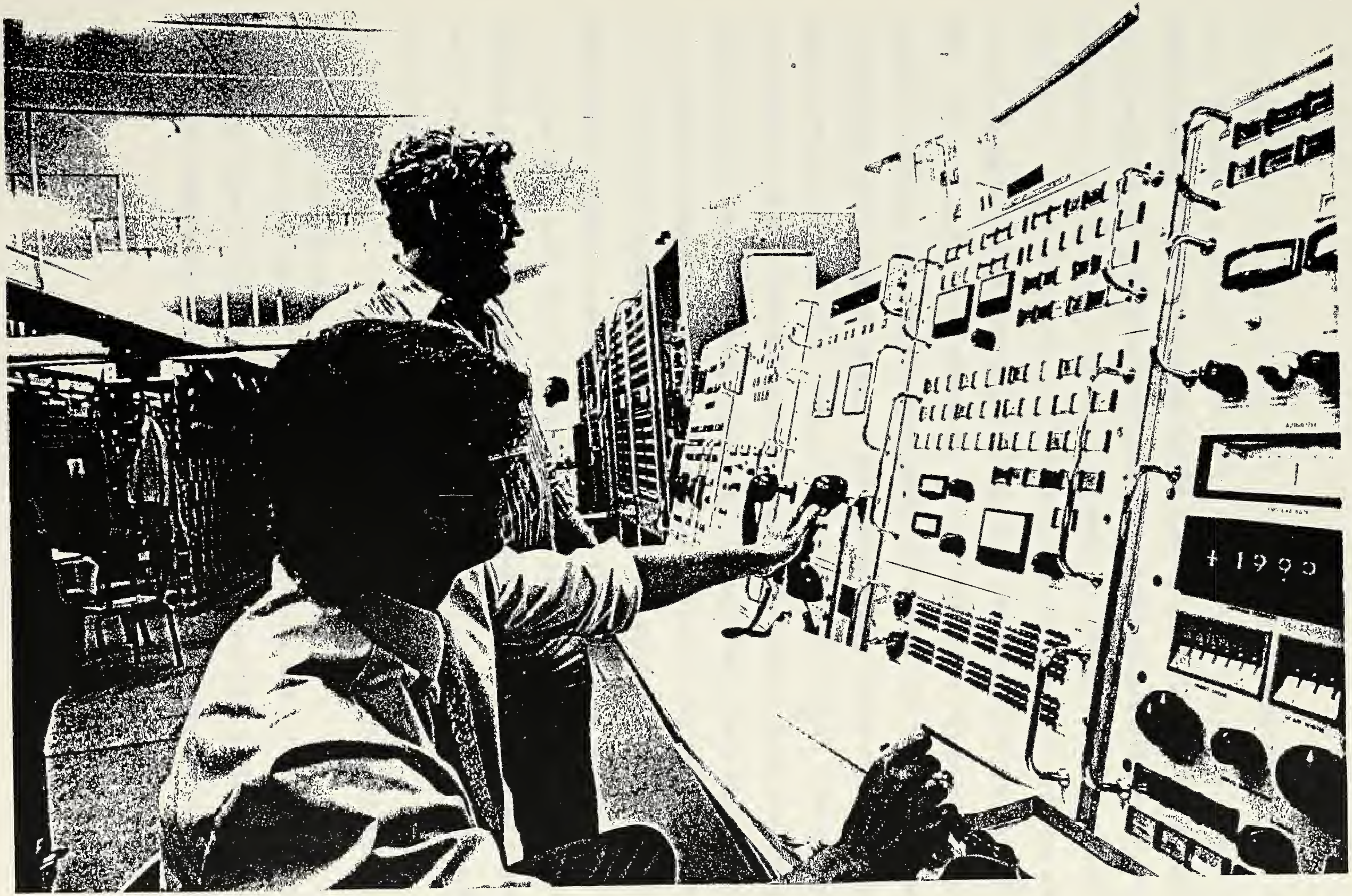
NICSO is the second case, after NADGEMO, of NATO's creating an NPLO to centrally manage the acquisition of a system that is commonly funded through the NATO Infrastructure Program. These two NPLO's, however, have had considerable differences stemming from the different scope of their respective responsibilities. Whereas NADGEMO was dealing with one contractor, for one project, and acting as an agent for the procuring host nations, NICSMA is the procuring authority (contracting in its own name) for a number of projects with various contractors, and ultimately responsible for integrating all of these into one system. Reflective of their differing roles and dependence on the support of national agencies, NADGEMO (the NADGE Organization was liquidated in 1977) never had over

58 people on its staff, NICSMA presently has a staff of some 250 (around 40% military and 60% civilian). Also differing from the NADGE Organization, NICSO is not likely to be liquidated (short of the alliance itself falling apart) due to never ending nature of its procurement, operational and maintenance functions. However, although the scope of NICSO's responsibilities are much broader than the NADGE Organization's, NISCO does not enjoy as much independence and flexibility as the NADGE Organization. For NADGE, the Infrastructure Committee and Infrastructure Payments and Progress Committee (P&P Committee) delegated most of their authorization and appropriation responsibilities to the intervening NADGE Policy Board for the project's duration (though still receiving their funding through the P&P Committee), whereas NICSO's Policy Committee has no such authority and NICSMA works strictly within NATO's Infrastructure procedures.

In fulfilling its responsibilities as the project management office for the design, acquisition, and integration of NATO's evolving communications system(s), NICSMA is naturally still dependent on receiving the effective support of the national governments' organizational, management and technical skills. As pointed out in 1977 by its first Director General, Lt. Gen. (ret.) Herbert Buchs,

"despite its title of Management Agency, NICSMA has some way to go in being afforded the authority, as well as the accountability, to build a truly integrated network."[26]

NICS: one of NATO's twelve terminal control and switching centers



Source: NATO Information Service

c. France and NICS

Whereas France participates in such NATO programs as the NATO Air Defense Ground Environment (NADGE), the Central European Pipeline System (CEPS) and the NATO Maintenance and Supply Agency (NAMSA), its policy of a-la-carte participation has resulted in her staying outside of NICS, at least up till now. In the early 70's France actually was very interested in and on the verge of joining the system, but it had to be placed on the back burner by President Pompidou. This is reputed to be due to the higher priority of another problem area of French-Anglo Saxon cooperation (or threat, from the viewpoint of Gaullist orthodoxy), British entry into the European Community. When NICS was being started up the French were negotiating on their participation, and an agreement was actually reached that would compensate NATO for those segments constructed prior to the establishment of NICS, while France had been out. Unfortunately, though, Pompidou was forced to postpone entry. According to a member of the U.S. Mission who has been intimately involved in this issue, if and when France does decide to come in, compensation for the backlog of prior investments would not pose a serious barrier. Given NATO's liberality the sum could be paid off over an extended period.[27]

d. Operation and Maintenance

Responsibility for the operation and maintenance of the NICS will be divided between NICSMA (civil and military) and the Central Operating Authority (COA, military only). NICSMA will maintain overall operational cognizance of the

system to ensure total system integrity as designed and operational compatibility for interface with other NICS and national civilian and military communications systems.[28] The NICS-Central Operational Authority, established in 1979, will be responsible for day-to-day control, operation, and maintenance of NICS.[29]

Until sometime in the early 1980's NICSMA will be funded by the NATO Infrastructure Program, since all of NICSMA so far has been working on implementation programs. NICSMA's annual operating costs were at around IAU 2 million in 1979, which was only for personnel costs and the running of the office. The NICS Operating budgets have not yet started since nothing was operating. Later when some of the systems are working and much of the effort will be on the operation and maintenance side, some of the costs (e.g. spare parts, electricity) will be transferred over to the Military Budget. As is the norm for such NATO Infrastructure funded projects the cost of the national personnel operating the stations will be picked up by those nations.

The NATO Maintenance and Supply Agnecy (NAMSA) provides support to NICSMA and the NICS-COA in the fields of supply, maintenance, documentation and configuration management.

e. Cost and Work Sharing

Since NICS involves a continuing series of projects, a relatively equitable sharing of production between the national industries can be accomplished effec-

tively over the long haul and need not be achieved within the constraint of one project or over a short period of years.

Each participating nation's industry received a target share of the contracting for NICS. In line with the rule-of-thumb that American industry has received about half of the 30-35% of infrastructure funds spent on sophisticated work (the U.S. having no competitive position at all on the remaining 65-70% of brick and mortar work, since it occurs almost exclusively in Europe), the U.S. share was figured at 47.5% and each of the other nations target share, figured on the basis of contributions, decreased pro rata. Each nation was then guaranteed over the long run 80% of those target shares which leaves a 20% margin up for grabs.

United States 38.0%

FRG 12.5% United Kingdom8.8% Canada4.6% Italy4.5% Belgium3.2% Netherlands2.9% Denmark2.1% Norway1.7% Turkey0.75% Greece0.46% Protugal0.21% Luxembourg0.12% Uncommitted20.0%

Given their competitiveness, this could result in American industry getting somewhere around 58% of NICS workload over the long run. The 42% or so remaining that is guaranteed to non-American firms includes civil engineering, crypto equipment,[30] any expenditure such as national and out-of-country labor at the sites, plus several cases of specific requirements to lay a certain amount of work off from predominantly American industrial efforts to non-American subs, while at the same time attempting to keep it as non-specific as possible (e.g. for the SATCOM III Ground Stations contract signed in June 1978 it was required

that 37% of the work be laid off to non-American firms).[31] Towards this aim of promoting work sharing for NICS, NICSMA has developed a comprehensive computer-based system which maintains a continual check on the production share for each nation, thus ensuring, as the system evolves, that each national industry receives its 'juste retour' of NICS expenditures.[32] The above arrangements, therefore allow for a reasonable balance of an equitable yet rational allocation of work during the ongoing implementation of NICS.

f. Component System Contracts--NICS Stage I

With the defining and planning of the principal NICS Stage I subsystems completed, the following contracts were let by NICSMA during the second half of the 70's.

- the Telegraphic Automatic Relay Equipment (TARE);
- the Pilot Secure Voice Project (PSVP);
- the Initial Voice Switched Network (IVSN);
- various Transmission Media projects;
- the SATCOM space and ground segments;
- the Sub-system Integration Project (SSIP), Phases I and II.

Several larger projects, such as the modernization of ACE-High, have not yet been implemented. In addition to the above projects, NICSMA has also been developing a Unified Management Information and Reporting System (UMIRS) to serve NICSMA, the major NATO Commands (MNC's), the Central Operating Authority and the subordinate organizations. The UMIRS is being developed in close coordination with what will
be its principal users.

As of late 1979 NICSMA had awarded contracts in an amount of some IAU 120 million of the IAU 150 million expected to be required for completion of Stage I of NICS. NICSMA had requested IAU 110 million for Slices XXXI-XXXV (1980-84) for completing Stage 1 and a good part start on Stage II.

(1) TARE

The Telegraphic Automatic Relay Equipment (TARE) Project will be one of the world's largest integrated message relay networks. TARE will provide NATO a system similar to the US AUTODIN. The systems will be installed in NATO communications centers between 1981 - 1983 as part of a project to establish an integrated capability within the Alliance. The first equipment will be installed in SACLANT's Headquarters in Norfolk, VA., in early 1981. The remaining equipment will be installed at bi-monthly intervals through 1982. These systems automate the transmission, reception, processing and distribution of most printed messages. Each message relay center will have two redundant systems. A $40 million fixed price contract was awarded by NICSMA to Litton

Data Systems in 1976 for 12 NICS/TARE computerized communications systems. In early 1978 NICSMA exercised an $11.3 million option with Litton for 9 additional NICS/TARE systems.[33]

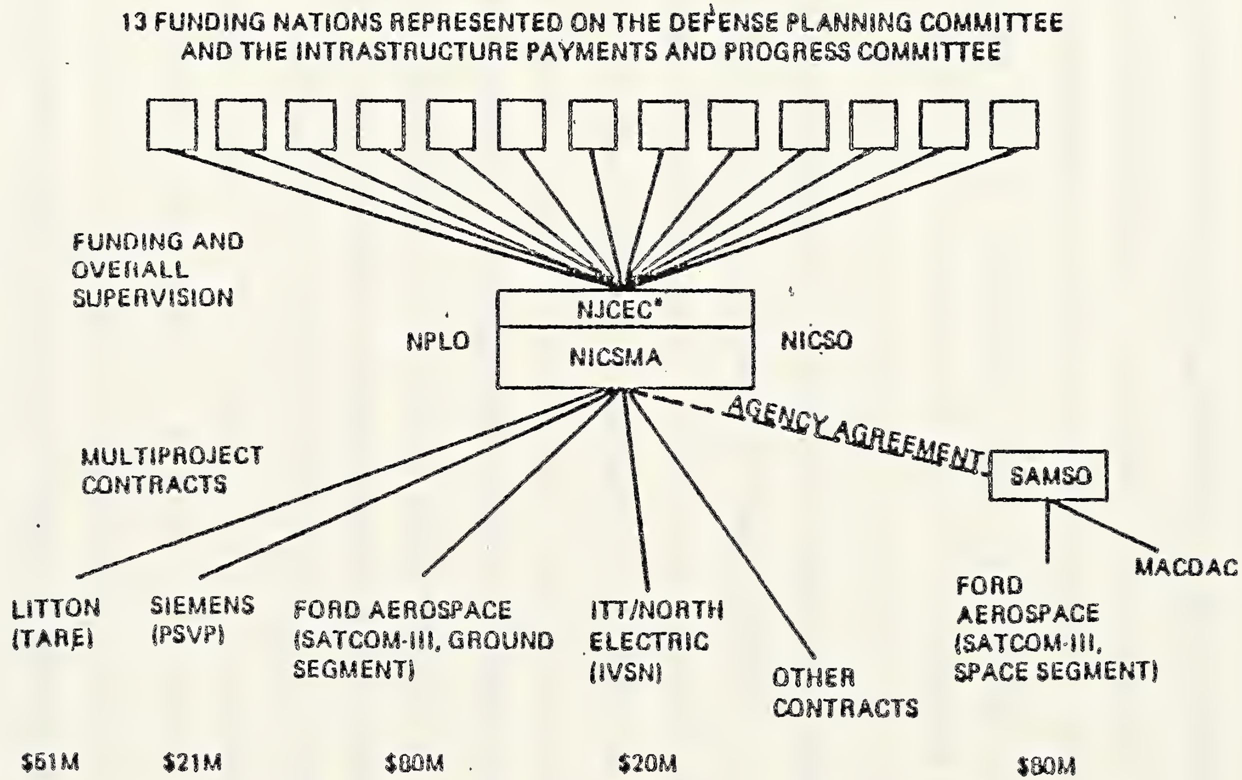
Based on a NJCEC decision, the U.S. NICSMA and MNCs are taking steps to insure direct electronic interoperability between the TARE and the U.S. Automatic Digital Network (AUTODIN) System. The U.S. Defense Communications Agency (DCA) is acting to resolve technical/procedural differences so that the electrical interface can take place.

Until the NATO TARE becomes operational, the U.S. offered NATO interim use of its record message processing capability. Because of delays in implementing the TARE program, SHAPE accepted the US offer in January 1978, and requested nine NATO headquarters locations be considered for AUTODIN terminals. The joint U.S./SHAPE proposal was approved by NATO in July, 1978. The U.S. loaned NATO the necessary cryptographic and interface equipment. Under DCA direction U.S. installation teams activated AUTODIN terminals at nine NATO headquarters in February 1979. The US also provided on-the-job training to NATO operational personnel and is providing maintenance and logistics support.[34]

(2) PSVP

The Pilot Secure Voice Projects (PSVP) is one of a number of sub-projects of the Crypto project. PSVP serves as an interim measure designed to satisfy minimum communications security requirements until a more comprehensive system can be

MAJOR NICS COMPONENT SYSTEM CONTRACTS



*NATO Joint Communications-Electronics Committee also serving as NICSO Policy Board

developed. Siemens (FRG) is providing 400 Elcrovox scramblers for $100,000 per unit. By early 1977 secure voice equipment had been installed and was operational in 100 of the 250 stations, which range from the SACEUR HQ down to batallion level. Since then, NICSMA has contracted for another 105 secure voice stations to meet the requirements of SACEUR's secure voice plan.[35] As part of PSVP, NICSMA has also contracted with Page Europa for four-wire switchboards, 24 of which have been provided so far, along with control units to the 1600 nominated users. In addition to Siemens and Page Europa, AEG-Telefunken also has a major role in this effort. Untimately the dedicated manual switchboards will be abandoned and the voice coders integrated directly into the IVSN.[36]

(3) IVSN

The Initial Voice Switched Network (IVSN) contract for the supply of 25 voice access switches was signed in September, 1976, with ITT/North Electric for $20 million, with delivery to begin in May, 1980. IVSN is similar to the U.S. AUTOVON system. From then on the remaining switches will be introduced at regular intervals ending in late 1982.

As with TARE, the interconnection of NATO and the national defense communication systems is being pursued with IVSN. In January 1978 the U.S. proposed to NICSMA that the capability should be developed in the IVSN access switch to interconnect automatically with AUTOVON switches in Europe so as to improve flexibility under exercise, crisis and wartime conditions.

NICSMA agreed that ITT/North Electric should study the feasibility of providing such a capability. In late 1978 NICSMA/DCA discussions with the ITT/North Electric resulted in a proposal which would provide study, test and demonstration of two types of AUTOVON/IVSN interconnections.

In mid-1979 ITT/North Electric provided NICSMA with a cost and technical proposal for developing and testing a NATO interface unit that will allow interconnection with national communications systems.

By merging the AUTOVON/IVSN and IVSN interface unit developments, a resulting cost savings of approximately 20% over two separate interface developments could be realized. As of early 1980 NICSMA was taking steps to obtain funding approval for the development and feasibility demonstration of the two IVSN interfaces.[37]

(4) Transmission Media Projects

Since NICSMA's assumption of responsibility for the existing and future transmission media systems owned by NATO, seven sub-projects have been completed which expand and modify the original ACE-High system. As of early 1977 NICSMA was dealing with some 25 individual transmission media sub-projects in order to provide the necessary transmission support for Stage I of NICS throughout NATO's member states. These have been only small projects and have mostly been awarded to local contractors, as a means of balancing the production shares of certain countries which had had difficulty in attaining them.

(5) NATO SATCOM

The NATO SATCOM project, which both antedates NICS and is the most expensive of its component systems of NICS, is treated separately in more detail in the following section.

(6) SSIP

Phase I of the Sub-system integration project (SSIP) design was completed in December 1976, providing NATO, for the first time, with an inventory of the communication assets at each of the sites visited.[38] Phase II of SSIP began early in 1977, and will provide the ancillary equipment that will ensure the introperability of all the NICS subsystems. This will involve 33 major sites and approximately 270 secondary sites.

g. Related SHAPE Procured Systems

SHAPE had, in addition, opened bidding in 1979 for two large communications projects which fall outside the NICS framework:

- The Computer Assisted Message Processing System (CAMPS) will automatically process messages in the proper format for transmission and provide automatic interface between NICS and military computers. CAMPS was awarded to a Danish contractor Rovsing for IAU 5.4 million; -The Status, Control and Reporting System (SCARS), which was awarded to Burroughs (US), for some IAU

7 million, is designed to control the status and release of nuclear weapons.

h. NICS and National Projects—the U.S.

As the NICS design and implementation proceeds, a greater level of U.S. funding commitment and coordination will be required to fulfill U.S. responsibilities in support of the evolving NICS I and II. The Director, Defense Communications Agency (DCA) was designated the U.S. Manager for coordination of those U.S. national projects identified in NICS plans and programs. To foster proper service resource planning and programming through the Planning, Programming and Budgeting System cycle, applicable U.S. NICS-related programming will be included in the DCA Five-Year Program and the DCS Plan.[39]

i. NICS Stage II

NICS Stage II will involve a further expansion of NICS' capabilities. Stage I of the NICS program will bring NATO-wide communications to within a generation of the U.S. defense communications network. Stage II should narrow the gap even further, as well as providing increased interoperability. The most important feature of the NICS program is probably the secure voice system, the lack of which has long been recognized the greatest weakness of the NATO C^3 environment.[40]

NICS Stage II Architecture which was completed by NICSMA with SHAPE Technical Center (STC) and national agency assistance, was reviewed and commented on by the NICS Policy Committee (NJCEC) in the spring of 1979. Certain areas within the architecture were identified for further study by NICSMA/STC/national technical experts, and for review and resolution at the November 1979 NJCEC meeting. One of the thorniest issues has concerned the type of digital system to be chosen. Based on NJCEC agreement on the architecture concept, NICSMA will complete the design and implement the program over the years 1980-95.

The NICS Stage II system will be built around 50-60 nodal switches serving the subscribers through some 600 switches and 400 medium speed message terminals (MSMT), most of them being tied together by the current ISVN units which will serve as concentrators for the nodal switches. The TAREs will be converted to Message Distribution Centers (MDC) which will store or process messages that cannot be immediately handled by the switching units.[41]

It is estimated that NICS II funding from NATO will come to about $100 million per year for the period 1980-1995. Further major participation by American firms in Stage I is unlikely because of the shares allocated to the various nations. U.S. participation in NICS II, however, is wide open.[42]

j. Interoperability and Security of Allied Communications

While the NICS will provide the backbone for Alliance communications, national systems will continue to carry their individual administrative, logistics and

tactical communications loads. The Military Committee, the Conference of National Armaments Directions (CNAD), the NATO Joint Communications-Electronics Committee (NJCEC) and the NATO Command, Control and Information Systems and Automatic Data Processing Committee (NCCDPC) prepared a study of the interoperability and security of military communications. The report was jointly submitted to and approved by, the Alliance Defense Ministers meeting in May of 1977. The report recommended (1) that no future communications systems, or multi-functional systems which provide communications, should be developed or procured without consultation and without consideration being given to collaboration among all of the nations concerned to assure interoperability to the levels appropriate to the systems in question, and; (2) that they would give their direction and support to achieve the interoperability and security of military communications.[43]

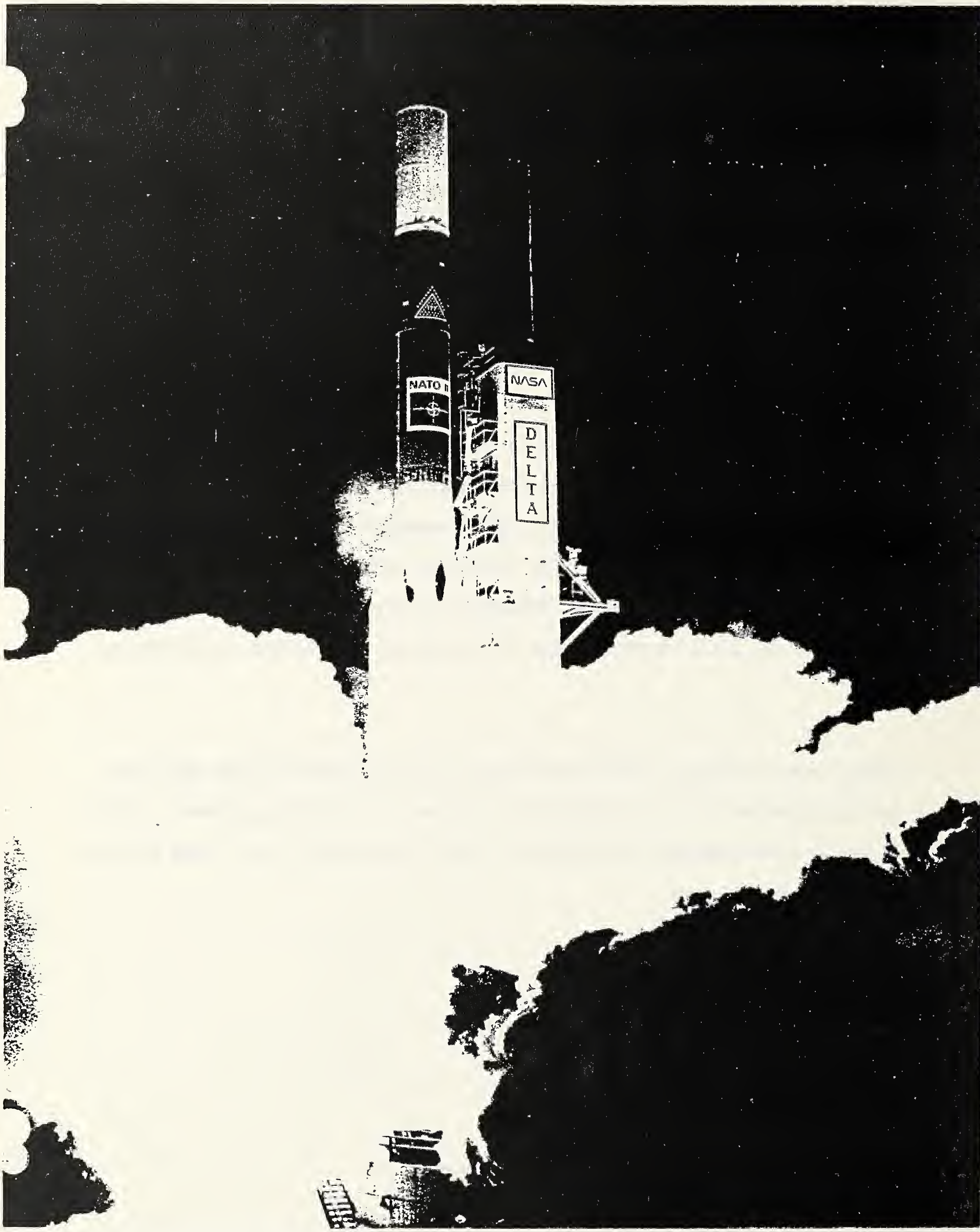
6. NATO SATCOM

The NATO SATCOM system, in both its space and ground segments, antedates the establishment of NICS, being one of the existing systems for which NICSMA has gradually taken over responsibility from SHAPE. The planning for NATO's Satellite Communications (SATCOM) system began in 1961 when NATO formed a Working Group to study the possible application of satellites to provide another communication link between NATO headquarters, the NATO countries, and the military commanders.[44]

The working group's report was positive and was unanimously approved in 1963, by all NATO member states and the major NATO commanders (MNC's). It was not until three years later, however, in 1966, that technical developments had progressed sufficiently for NATO to consider entering the field. In that year an agreement was reached on a U.S. proposal that NATO embark on a three-phased SATCOM program.[45]

Phase I was to provide initial experience for Allied Command Europe (ACE) and provide experience for the training of a nucleus of operating personnel. Phase II was to provide NATO with circuits for civil and military use. Phase III was to satisfy future needs.

The 1970 launch of a NATO communications satellite at Cape Kennedy



Source: NATO Information Service

a. NATO SATCOM Phase I

For Phase I the United States offered NATO limited satellite time on several of its initial defense communication satellites (IDCSS). Phase I, initiated by SHAPE and the SHAPE Technical Center in 1967, was to provide experience for military personnel in operating a larger system. In accepting the U.S. offer, SHAPE leased, and later bought, two transportable ground terminals from Philco-Ford, known as MASCOT Terminals. These were operated for several hours a day between SHAPE in Belgium and AFSOUTH[46] in Naples, Italy.[47] Several months after they became operational it had become clear that PHASE II could not be implemented as quickly as had originally been thought, so Phase I was extended from its original one year duration until September 1969, and later to July 1970. At the completion of Phase I, 66 operational and maintenance personnel from the 12 participating nations had completed their initial training. The MASCOT ground terminals were then transferred to SHAPE Technical Center in the Hague, for use in systems tests and evaluation of the Phase II program.[48]

b. NATO SATCOM Phase II

For Phase II of this Infrastructure project NATO appointed SHAPE to be the host nation, for planning, acquisition, implementation and commissioning. Phase II consisted of two satellites and 12 ground terminals, one to be located in each

NATO member state except, France, Iceland, and Luxembourg. Phase II's first priority was to provide voice and telegraph communications between NATO delega-

tions and the national capitals. As a secondary objective it was also to provide voice and telegraph links between NATO commanders.[49]

(1) The Space Segment

The satellites were designed, developed, and manufactured in the U.S. under an agreement between the U.S. Government and SHAPE, as an add-on to a prior U.K.-U.S. agreement for the U.K.'s SKYNET satellite.[50] The NATO-2 satellite is almost identical to the U.K.'s SKYNET, except for a tilt in the antenna. The total cost of the space segment came to around $20 million.[51]

The USAF's Space and Missile Systems Organization (SAMSO) acted as the contract administrator for SHAPE, running the competition under the ASPR, with funding through the usual NATO Infrastructure procedures. Acting as SHAPE's agent, under a US-SHAPE Memorandum of Understanding (MOU), SAMSO contracted with the Philco-Ford Corporation as if it were the client, but in the name of NICSMA.[52] Two satellites were procured, although the program was basically designed to operate on one, so as to have one in immediate reserve to counter any failure that might have occurred.[53]

The first NATO-2 satellite was launched by NASA on a McDonnell Douglas Thor Delta at Cape Kennedy on March 20, 1970. The second stand-by satellite was to be launched September 30, 1970, but was temporarily delayed due to the failure of the SKYNET launch in August.

After the launch, the satellite's performance was checked out—initially to check that the system performed according to contract specifications and thereafter to follow and record its behavior throughout its lifetime. This was at first accomplished by the United Kingdom's Christ Church test facilities, later being transferred to the SHAPE Technical Center, The Hague. The satellite control and housekeeping functions are taken care of by the United States Satellite Control Facility in Sunnyvale, California.[54]

(2) The Ground Segment

On May 8, 1968 SHAPE, acting as NATO's host country for the SATCOM Phase II project, issued an international call for Bid (ICB) for the ground segment.

On August 8, 1968, ITT's Standard Elektrik Lorenz (SEL,FRG) acting as prime contractor, submitted its offer on behalf of an international consortium. In addition to SEL the consortium included Brown, Boveri & Cie (BBC, FRG); Marconi Space and Defense Systems (MSDS, UK); Rohde & Schwartz (R&S, FRG) and Selenia (Italy). This was carried out under the usual NATO Infrastructure bidding procedures except that, in order to compensate for the lack of non-American competition on the space segment, the U.S. government had agreed that no American firms would compete for the ground segment. Work sharing among the national industries followed a strict formula guaranteeing nations 90% of that part of their contributions considered to be applied to the cost of the terminals. Since the space segment took such a large part of the Phase II funding—the cost applied to the ground terminals amounting roughly to some 60%

of the cost of Phase II—this target share on which the 90% was figured only amounted to some 75% of actual non-U.S. national contributions.[55]

SEL later had considerable difficulty in fulfilling this overly rigid 90% guarantee, e.g., the civil engineering portion of the work in itself could not give such developing nations as Greece, Portugal, and Turkey their 'juste retour'.[56]

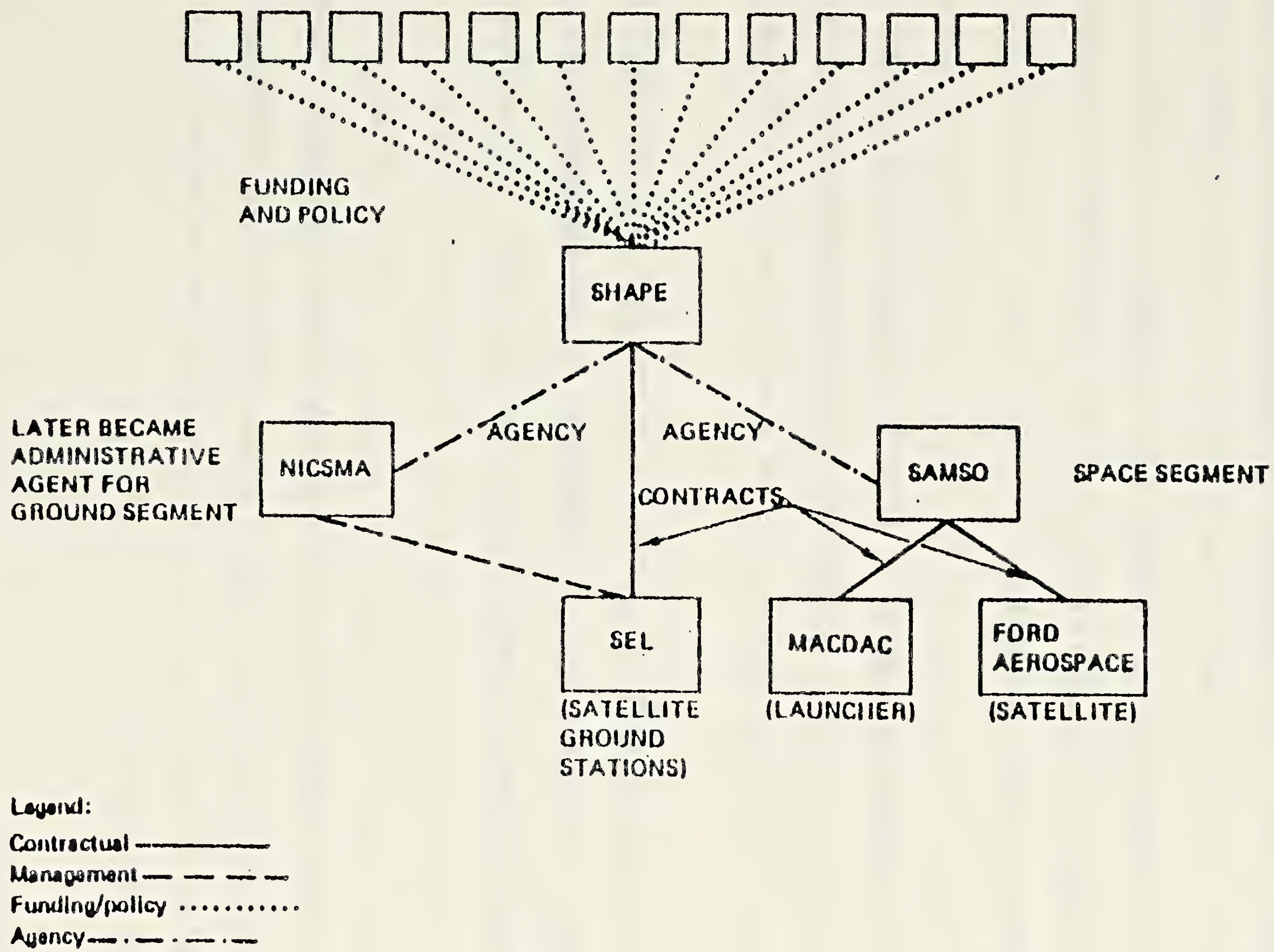
SEL's offer had been accepted by SHAPE, winning at a much lower price than the second and third bidders, and the contract was awarded by letter agreement on February 17, 1969, between SHAPE and SEL.[57] The contract was to be completed within a period of 24½ months, at a fixed price of DM 102.98 million, plus a one-year warranty with heavy penalites for unexcused late performance. By a later agreement the price was increased to DM 124.7 million, and the time was extended to 31 months (plus warranty) to cover some design changes required by SHAPE.

During performance, the contract was transferred by SHAPE to the newly established NICSMA, but for adminstrative purposes only. SHAPE retained the full responsibility for its obligations under the contract and for actions (or lack of actions) of its assigned administrators—a point pertinent to the later SEL-SHAPE

dispute, with NICSMA being a party to the arbitration proceedings, but only as an administrative agent.[58]

NATO SATCOM-II

13 FUNDING NATIONS REPRESENTED ON THE DPC, PAYMENTS AND PROGRESS COMMITTEE AND SHAPE



The contract called for the delivery of a satellite ground terminal communications system that would provide direct communications between NATO/SHAPE and each of the Ministries of Defense (i.e., one in each member state except for Iceland, Luxembourg and France—France being the only NATO member not contributing). Signals were to be transmitted via satellite to and from 12 satellite ground terminals (SGT's). Deliveries of spares and other equipment were also to be made to the SHAPE Centralized Supply Facility (SCSF) at the NATO Maintenance and Supply Agency (NAMSA), in Luxembourg. All 12 SGT's were to be equal in size though varying in circuit capacity.

The country in which each station is located provides for the required manning of stations. While initial training had been provided personnel during Phase I, the follow-on training was provided at the training facility at Latina, Italy.[59]

There were three major parts to contract performance. The first part included system design, and manufacture and procurement of the equipment. This also included prototype testing (Phase I tests) and production testing (Phase II tests).

Since SEL was required to procure the various units of the system according to a production sharing formula, as happens often enough in "NATO" contracting, SEL lacked complete freedom of choice as to the selection of subcontractors outside the original consortium.[60]

During the second part, SEL assembled and performed "pre-delivery terminal type-testing" (Phase III tests) upon representative equipment for a "Link Terminal", which consisted of the major portion of the mechanical/electronic equipment for a complete SGT. SHAPE was not required to "accept" any equipment, or to make any payments during, or upon completion, of Phase III tests.[61]

The third part covered acceptance. This involved the installation of equipment into each of the 12 SGT's and the performance of "terminal acceptance testing" known as "Phase IV tests." Upon completion of Phase IV testing, SHAPE was to grant provisional acceptance of each SGT and SEL was to receive partial payment. The entire system was then subject to Phase V, "System Acceptance Testing", to be followed by Final System Acceptance and payment of the balance of the contract price.[62]

When the project was completed, SEL had built and delivered to SHAPE one of the most sophisticated communication systems in the world with an availability factor of more than 99.9%, i.e., less than 9 hours per year of down-time. Infact, the system was so good, SEL reported, that SHAPE was in a position to voluntarily reduce the time contractually allocated for the system acceptance testing (Phase V tests) by 30%.[63] However, contract performance difficulties had arisen which eventually led to a major dispute between SEL and SHAPE.

c. NATO SATCOM Phase II—The SEL-SHAPE Dispute

From the NATO viewpoint, the problems on the contractor's end stemmed primarily from the fact that SEL wasn't properly set up for the contract. ITT-US took the elimination of American content very seriously, so they provided no assistance to SEL for the job, sending no systems engineers. There weren't any problems with the manufacture of hardware. The problem arose when it came to the systems aspect of the project. In the words of T.J. Loveland, of the U.S. Mission to NATO, "it was just too much to expect SEL to do something the first time around, that no European firm had done up till then". In any event, ITT did eventually come in with a team of lawyers to press their claim against NATO. The parties did not reach a settlement until early 1978, after the intervention of the Belgian 'Court de Cassation'.

On the other side, according to SEL, "...SHAPE abandoned the basic concept of this fixed-price, "time is of essence", contract and instead treated it like an R&D project." SHAPE demanded excessive amounts of additional work, particularly with respect to testing, consistently failed to perform its obligations, and otherwise caused serious and repeated delays, all of which were in direct violation of the contract. For example, the contract had provided that "type testing"

(Phase III) and "terminal acceptance testing" (Phase IV) would take a total of 8 months. After such testing had already begun, however, SHAPE directed SEL to "reschedule" major portions of the testing programme and even ordered that such

testing must be "extensively supplemented and revised". Because of these and other breaches of contract by SHAPE, the time required for such testing was expanded by more than 300%, from 8 to 28 months—more than the time originally planned for the entire project. There was no major defect found with the equipment which would have justified such enormously excessive testing (and the consequent delays caused by SHAPE).[64]

Further, the tests could not proceed as scheduled because SHAPE failed to finalize its necessary approvals and modifications of test procedures and to provide witnesses when required and otherwise directly caused delays and increased costs suffered by SEL.

Other such breaches of contract listed by SEL in its Statement of Claims included SHAPE's failure to supply essential personnel such as Mobile Maintenance Teams as required by the contract, its insistence that SEL perform to specifications which SHAPE knew to be unachievable, its wrongful delays in payments due to SEL, and its general disregard of its contractual obligations.[65]

According to SEL, such breaches of contract by SHAPE made it impossible to perform the contract according to the time schedule or at the prices originally agreed. SHAPE caused performance to be delayed by more than 17 months and thus caused SEL to suffer direct financial damages in excess of DM 35 million. SEL's damages were even greater because SHAPE refused to pay even the price stated in the contract. For one thing, SHAPE claimed that the additional time required to

perform this contract constituted "late performance" and, therefore, imposed penalties upon SEL by deducting DM 11.419.304 from invoices otherwise due to SEL. In addition, SHAPE held the sum of DM 1.331.957 which was long overdue but which SHAPE arbitrarily had refused to pay to SEL.[66]

For a detailed account of the following SEL-SHAPE dispute as told by SEL to support its position in arbitration, see Appendix I.

After some three and a half years of negotiations aimed at reaching an amicable settlement, in October 1974 SEL advised the SHAPE contracting officer that it would proceed with the preliminary steps toward independent arbitration. In November, 1974, the contracting officer responded by returning the SEL claims. Faced with an impasse, the contractor felt it was left with no alternative other than going to the Belgian Courts to get a ruling on its request for independent arbitration, initiated by a letter of March 4, 1975. For four years SEL had been attempting, without success, to get a resolution of its claims, first by negotiations and then by depending upon SHAPE to render the necessary decisions under the preliminary steps of Article 33 of the contract.[67]

Going to the Belgian Courts was feasible, since SHAPE, unlike NATO (or any of its subsidiaries such as NICSMA) has no immunity of jurisdiction. If NICSMA had been the other contracting party, it could never have been settled by a Belgian Court. Unlike NPLO contracts, where an arbitration clause is mandatory, SHAPE contracts generally don't have an arbitration clause, but can have one if both parties so agree. Whereas NATO and its subsidiary bodies draw their immunity

from the Ottawa Agreement of September 1951, SHAPE's status derives from the Paris Protocols[68] of August 1952 which gives it a juridical personality and various privileges, but no immunity of jurisdiction.[69]

It took over a year, before a Belgian Court decided that it had jurisdiction, and that the contractor had been denied his rights to institute arbitration proceedings under the contract. Faced with the Belgian Court's decision, NATO responded quickly, deciding that the time had come to talk to SEL. NATO[70] itself reached the conclusion that SEL had not received fair treatment from the contracting officer. NATO settled with the contractor in early 1978, outside of the courts, for amount of DM 33 million, including primarily the DM 12 million withheld and the 7½ years of back interest on it. The rest was interest and other claims—there being offsetting claims that NATO had against SEL.[71]

This dispute caused considerable consternation within NATO and led to a further examination of the case.

There appears to have been several American and German contracting officers that were basically out to get the contractor—to prove that it couldn't get away with treating NATO[72] in this manner. In the future, NATO plans to avoid the possibility of several such individuals—ASPR zealots in this case—getting it into a tight spot.

Unfortunately, NICSMA had at first adopted the ASPR for its own procurement regulations, with German amendments everytime the German regulations were even

less practical. Since then, NICSMA's procurement regulations have been considerably watered down. In particular, with regard to the SEL claim against SHAPE and the management of the contract, it had taken several years for NICSMA to come to the realization that millions could be wasted if test requirements were indiscriminantly exercised.[73]

Due to its having been nailed so badly, NATO's response to the SEL dispute is simply, "it won't happen again." The NATO managers handling the contract had been allowed to deal in a vacuum, without the governing committee being aware of what was going on. Since then, NATO has been working on new rules so that the Infrastructure Payments and Progress Committee can maintain overview of contractual relationships so as to be fully aware anytime they become contentious.

When things get to a certain point, the P&P committee should be brought in to do its own arbitrating, by designating one of their own number. The idea is to be able to look at the situation, talk to both parties, and then decide whether the NATO managers have any real justice on their side or not. "In summary, what we'll be after is a way to keep the budget control guys in the picture enough, so that they can recognize a dangerous situation in time."[74]

d. NATO SATCOM Phase III

(1) Space Segment

Planning for NATO SATCOM's Phase III got underway in late 1970. As in Phase II, procurement of the satellite segment (NATO-3) was handled through the USAF's SAMSO.[75] Whereas, the prior purchase of the NATO-2 satellites had been basically just an add-on to a British-U.S. agreement, this time SAMSO ran a national competition under ASPR, selecting Ford Aerospace and Communications Corporation[76] over competitors TRW and Hughes. Although Ford faced no required percentage of work to be passed to non-U.S. subcontractors, they were requested to lay off as much as possible which turned out to be around 4%. In NICSMA's name, SAMSO contracted with Ford for the NATO-3 series of three satellites, and with McDonnell Douglas for its Delta 2914 launch vehicles. All three satellites which were launched in April, 1976, January, 1977, and November, 1978, from the Kennedy Space Center in Florida, are designed for seven-year lifetimes. At the end of 1979 NATO had one operational satellite (NATO IIIA), an in-orbit spare (NATO IIIB), and one satellite stored in space (NATO IIIC). NATO's communications satellites cover two general areas—a European band and an Atlantic band.[77] The total cost to NATO of these three satellites and their launches came to $80 million.[78]

NATO, the U.S. and the UK have agreements which provide for sharing of satellite power and bandwidth in order to satisfy critical communications requirements in the event of a satellite failure. When a U.S. satellite launch was delayed in

1977 and subsequently a satellite launch was unsuccessful in 1978, this capability proved to be of value.

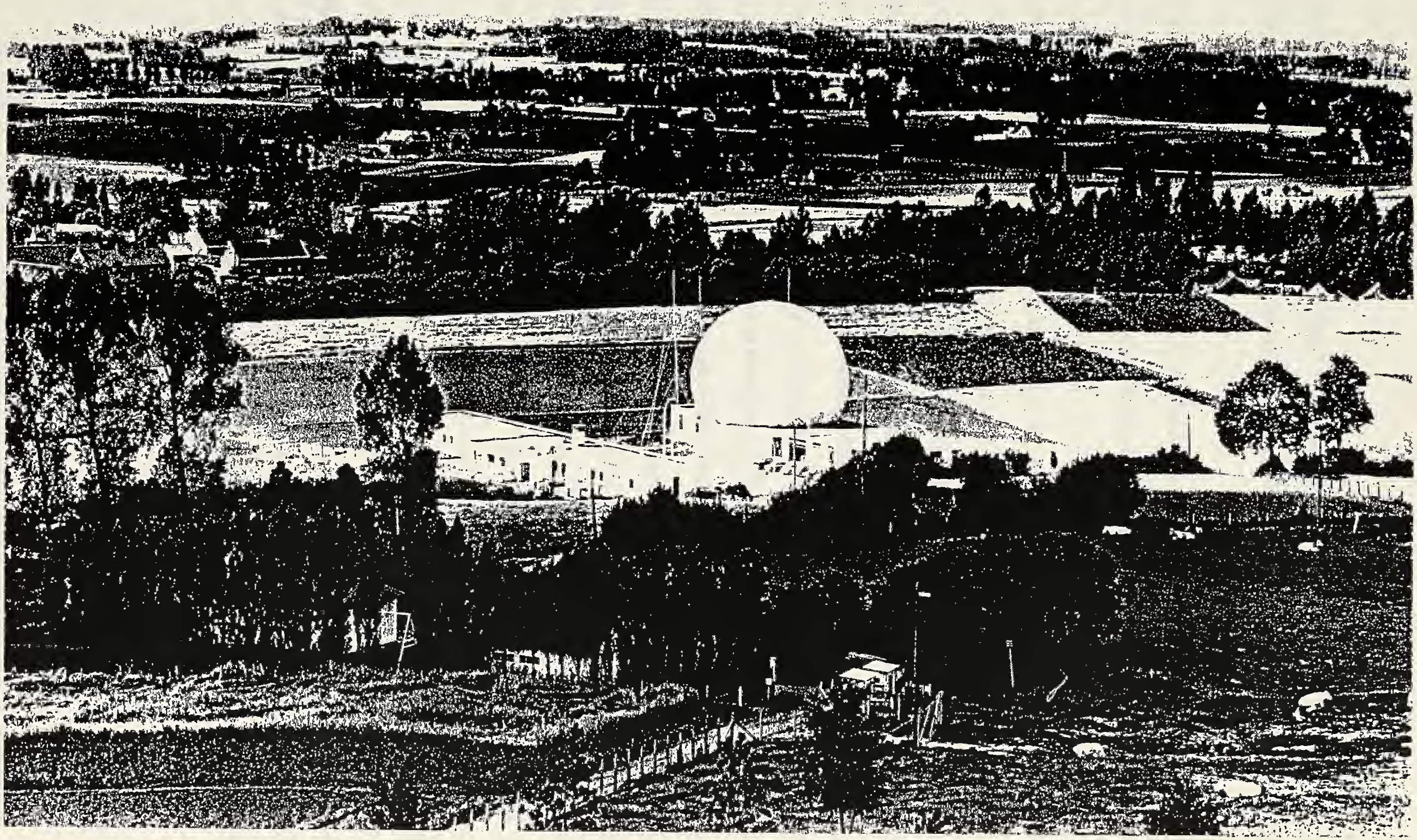
In order to assist the U.S., NATO launched its backup satellite one year early, in January 1977 and positioned it over the eastern Pacific for exclusive U.S. use. This NATO IIIB satellite was returned to NATO in February, 1979 and was positioned over the Atlantic to serve in its original role as the NATO backup satellite.

Shortly thereafter, on May 7, 1979, the U.S. Atlantic satellite entered an impaired condition. The U.S. Defense Communication Agency (DCA) requested use of the NATO satellite and NATO authorized routing of nine circuits on the NATO IIIA satellite. This restored those circuits affected by the U.S. satellite failure. The U.S. Indian Ocean satellite was relocated to the Atlantic and replaced by an in-orbit spare. These actions were completed on June 7, 1979 and all U.S. circuits were transitioned from the NATO 111A satellite back to a U.S. satellite.[79]

(2) Ground Segment

Phase III's satellite ground terminal (SGT) program calls for the modification of the 12 existing SGT's, 10 additional SGT's plus two mobile terminals (transportable by Lockheed C-130's) for Allied Command Europe (ACE) and a new terminal for training at the NATO Communications School at Latina, Italy. The

The NATO SATCOM ground terminal located in Belgium between SHAPE (Mons) and NATO Headquarters (Brussels)



Source: NATO Information Service

new SGT's will be built in two groups of five stations each, with the two mobile terminals and the training unit to be procured in the first group as well.

The procurement of the second group of five stations will possibly also include additional mobile stations—a need presently under study.

Ford Aerospace and Communications Corporation also won the separate competition directly managed by NICSMA (SHAPE had originally managed Phase II), for the ground terminal segment of Phase III. The funding and competition were both within the normal NATO Infrastructure framework, selecting the contractor on the basis of 100% compliance with specifications at the lowest cost. In June 1978, Ford signed the $80 million, 50-month contract with NICSMA for the first group of eight terminals (five fixed,[80] two mobile and one training facility) and the modification of the existing 12.[81] This expanding and upgrading will provide fully digital communications capability compatible with the current NATO communications satellites. The contract also provides an option for the construction of five more non-mobile stations in Canada, Portugal, the FRG, Italy, and the U.S.

Although this time the competition was open to American firms and there was no required fulfillment of 90% of BOP, Ford was required to lay off 37% of the work to non-American firms. Ford's major subcontractors were: the UK's Marconi Space and Defense Systems (also a subcontractor for SEL in the previous Phase II); the FRG's Messerschmitt-Boelkow-Blohm; and Page Europa of Italy (a Northrop subsidi-

ary). As of the time of contract award, responsibilities of each member of this international team had not yet been fully defined.[82]

There are normally 2 or 3 disputes a year concerning the application of NATO's "Procedures for International Competitive Bidding for Commonly Financed NATO Infrastructure Works," AC/4-D/2261 that result in arbitration.[83] Such a dispute came up during the bidding for the SATCOM III Ground Terminal, between NICSMA and Italy. The dispute was over the host country, NICSMA, having decided that an Italian contractor had not been responsive to the call for bids, since it hadn't met all the requirements. So, in following the decision of the Defense Planning Committee (DPC)—Permanent Representatives (Ambassadorial) level—and in accordance with paragraph 11 of Annex I to AC/4-D/2261 the Secretary General, Joseph M.A.H. Luns, appointed a Board of Arbitration to decide the matter. The Board of Arbitration was appointed through the Secretary General having requested "three participating countries in no way concerned in the dispute, each to designate a member to serve on the Board." The three countries in this case were Denmark, Norway, and Portugal. The first meeting of the board took place on March 29, 1978, and reported back to the DPC several weeks later, having decided in favor of NICSMA.[84] The Italian government conceded the case.[85]

e. NATO SATCOM Phase IV

The requirements package for the NATO-4 series of satellites, scheduled to be completed by NICSMA in late 1978, called for a major increase in capacity over

the NATO-3 series, and increase in lifetimes over the present seven years. The goal is to have a NATO-4 satellite in orbit by 1984.[86]

On the basis of a price competition, the NATO Infrastructure Payments and Progress Committee selected RAE, a British Ministry of Defense organization, to serve as NATO's agent for its procurement—even though NICSMA believed that the added risk of a non-U.S. agent was unacceptable.

The requirements for an increase in capacity and life-time mean that additional fuel and battery capacity in the satellite will be needed, almost certainly making a launch by the space shuttle necessary.[87] NATO communications officials also are seeking an expansion of the number of transportable ground stations, thus affecting the dimensions of the NATO-4 satellites due to the need for increased power to work with the smaller antenna of portable stations. In addition, the NATO-4 series is expected to have to work with a large number of NATO-assigned ships as well as with an expanded number of ground stations. It will also provide an interoperability link between NATO ships and the nationally developed ground stations in NATO nations, as well as between ground terminals.

Use of a frequency band common with the U.S. and British communications systems has been declared mandatory to permit NATO-4 to provide completely interoperative communications with the U.S. General Electric Defense Satellite Communication System - (DSCS-3) satellites. For NATO-4 the United States proposed a system based on the American DSCS III satellites, the first of which is scheduled to be launched in mid-1980. The U.S. cited considerations of

interoperability, economy, and flexibility to support its proposal, since the U.S. system was by far the largest of the national systems. Ford Aerospace and General Electric were the competing U. S. contractors. The British proposed the use of the European Communications Satellite System (ECSS) for NATO-4. The ECSS is currently in development for the European Space Agency and scheduled to begin postal and telecommunications duties in 1981. Whichever prevails, technology input is expected to come primarily from both the DCSC and ESA/ECSS programs.

The development of requirements and review of the technology to be embodied in candidate designs has been aimed at determining a realistic dimensioning of the space craft to meet NATO commanders' requirements during the decade after first launch. Planning called for one working satellite and one in-orbit spare, plus one or more ground spares. The total trend has been towards a larger number of satellites in order to hold down unit costs, although the cost tradeoff between a large production run and later modifying the system to take advantage of technology development and changes, was under study.[88]

In 1980, there was a change of plans. The NATO Infrastructure Committee decided to delay the NATO-4 program until 1987. To cover in the interim the U.S. Air Force's Space Division (replacing SAMSO in this capacity) ran another competition between Ford Aerospace Communications and TRW. In early January 1981, the U.S.A.F. Space Division selected to continue with Ford's NATO-3 satellites, over TRW's Defense Satellite Communications System III.

One NATO III series satellite and long lead components for a second were ordered in a letter contract. The new satellite was to be as close as possible in design to the originals, both to save money and to speed production. As is the norm with NATO Infrastructure procurement it was felt that state-of-the-art electronic components and power requirements would meet mission requirements.

The first of the two new NATO IIIs were expected to be launched in 1983.[89]

7. The Ford Aerospace SATCOM Contracting Experience

At a symposium in 1979 sponsored by the AFCEA[90] in Falls Church, Virginia, Douglas Dwyre of Ford Aerospace & Communications Corp. shared the following observations acquired over the years of working on the sequence of NATO SATCOM projects just described.

He initially made several observations on securing and performing NATO business, then moved on to some suggestions on how the paths of international collaboration might be straightened and smoothed. The following text is quoted virtually verbatim.

a. Difference in Approach to Defense Procurement

There exists a profoundly different view of the military-industrial relationship among the European NATO countries from that which we as U.S. contractors perceive. European industry operates in a much more restricted market than that

enjoyed by U.S. defense industry. As a consequence, the MOD's have fostered a system of "Chosen Instrument" firms which enjoy semi-monopolies for segments of national defense industry. The European firms point out that this business is not particularly profitable, but is undertaken partly for the technology inherent in the development and chiefly as a patriotic duty. Competition of a sort is maintained by the laborious and lengthy negotiations to achieve maximum performance and quantity within a tightly specified budget.

The U.S. military-industrial complex finds this lack of competition abhorrent and has enshrined the competitive process as a corollary of the free market, capitalist economy. The U.S. penchant for competition has found its way into NATO Infrastructure regulations for commonly-funded procurement and often presents difficulties in structuring multinational team bids in an environment structured by chosen instrument relationships. As American contractors participating in the NATO market, commonly-funded or multinational programs, we must be aware of and reasonably sympathetic to the European mores in defense procurement. Understanding the commercial background of one's partner results in a tailored, comfortable fit, while the "off-the-rack" arrangement tugs at the joints and wears poorly.[91]

b. <u>Realistic Attitudes Towards Industrial Collaboration</u>

Industrial collaboration has been pushed as a promising technique for achieving the RSI (Rationalization, Standardization, Interoperability) goals of the Alliance. Reduction of the number of redundant national programs, often not

interoperable and seldom standardized, coupled with the resulting larger production runs offering economics of scale, promise to reduce the overall Alliance expenditures on a given class of equipment, e.g. Combat Net Radios.

However, it must be recognized that even if the major political and economic problems attendant upon structuring an industrial collaboration program can be overcome, the development costs and initial production costs are almost certain to be higher than those of a single national program. Program management of an international team of contractors is a burden which few DoD SPO's or industry program managers will voluntarily undertake unless properly incentivized--or alternately, penalized for lack of international content.

c. <u>Our Perception of European Capabilities</u>

DOD and industry alike are frequently guilty of adopting a patronizing attitude towards European capabilities in defense programs. Often this attitude focuses upon a presumed inherent U.S. superiority in Systems Engineering and Program Management. In my experience, this observation has been somewhat self-fulfilling in NATO programs because of the unconscious imposition of Yankee approaches to these disciplines. Working with European firms on European Space Agency and national programs during definition phase contracts, I have found the European contractor teams quite capable and most anxious to participate in system synthesis, albeit with tools less finely honed than those of U.S. firms with teams dedicated to and experienced in System Definition.

Differences in program management techniques are frequently a product of a different commercial culture and do not signify any basic flaw in program control. However, the imposition of U.S. C-Spec, ASPR and CAS can result in some interesting mutations. Again, tailoring NATO Infrastructure program procurement plans and the proposals of international industrial teams to the strengths of national contractor segments will improve program performance potential, while a forced fit handicaps the program from inception. The tailoring of a good international team requires time—time which should not be added to the already lengthy NATO procurements schedules.[92]

d. The Necessity of Early Contractor Participation in Program Definition

There is uniformly a relatively late involvement of industry in the formulation of NATO program architecture. In national procurements, both U.S. and European, the dialogue between the procuring agency and industry is earlier, freer and deeper. This situation would be greatly improved by extensive use of System Definition Contracts in NATO procurement. In the U.S., team relationships are forged on the anvil of competitive Definition Studies. Opportunities for similar team activities in the conceptual phase are seldom available in NATO programs. RFP's are issued with fully detailed, often overly-detailed, Specifications and Statements of Work. Operating under tight proposal schedules, the prime contractor (usually a U.S. firm) must assume an autocratic role with little occasion for feedback and iteration involving European team members.

Insufficient structured communications between procurement offices and contractors is another factor resulting in relatively late involvement of industry in NATO procurement planning. Programs having their genesis in U.S. national development with potential NATO utilization as a follow-on are eagerly tracked by U.S. contractors.

In contrast, commonly-funded programs and multinational programs with host nations other than the U.S. are usually clouded by confusion regarding requirements, budget and schedule. The lack of a NATO equivalent of our Commerce Business Daily Publication is an example of the absence of regular wide-circulation communication regarding NATO procurement plans. The use of the office of the Director, Strategic/Industrial Production Sales, U.S. Department of Commerce and the information available for contractor review is a partial remedy; however, the security restrictions and inability to reproduce procurement planning documents limits the utility to that which one can carry away in his head. All parties concerned should examine what changes can be made in the direction of improving the free give-and-take within security restrictions which so effectively lubricates the procurement mechanism of DoD programs.[93]

e. <u>Doing Business With NATO</u>

Finally, Dwyre wanted to impart his observations to the audience on doing business with NATO, qualifying it as based on a lengthy, but rather narrow, experience base of satellite communication programs.

(1) An additional dimension of consideration should be given to team-formation and subcontractor management in the NATO market. European firms place a high priority on noble work, i.e. work with significant development content. Because of their bid category structures in which fringe and overhead costs make up a proportionately greater fraction of their total price resulting in a cost spread between a senior engineering specialist and a production technician that is less in the FRG than in the U.S., it is frequently most cost-effective to include the highest feasible portion of development in the European work scope.

(2) I run the danger of noting a truism on this matter, but it is of utmost importance to achieve well-defined elements of work leaving nothing to the assumption of standard practice. Ambiguity is certain to lead to problems in contract execution. A loosely drawn statement of work may suffice in U.S. subcontracting, but is the root cause of most contractual difficulties I have encountered in NATO subcontracting.

(3) Security requirements may make the necessary transfer of technical information between team members an onerous and time consuming task. Attempts to negotiate a prime contract with provision for direct contractor-to-contractor transmittal provisions can save many down-stream delays. Transmitting classified documents through five security offices before it reaches the user can result in costly delays.

(4) With the rapidly fluctuating exchange rates experienced in recent years, considerable attention should be given to negotiating a currency mix which accurately reflects the international payment plan to be implemented. Few of our companies willingly speculate in currency futures.

(5) In general, it is most cost-effective to procure labor, not materials, from Europe in satisfying a production sharing formula dictated by a commonly-funded procurement.

(6) European industry has generally tended to orient itself towards products, not systems. A program plan tailored to the product capabilities of European industry will generally result in a lower risk, lower cost program. Products generally have a broader after-market in third country sales which is of crucial importance to European industry. This secures their sharpest pencils in estimating costs.

(7) The selection of national companies (as opposed to multinational subsidiaries) is more favorably regarded by the MOD's in giving their support to a particular bid.

(8) Where the program product is to be sited in several nations, intricacies of the individual national customs and tax regulations become most complex. The existence of a NATO contract does not waive all problems and lack of prior consideration of these differences has led us into costly and time-consuming difficulties.[94]

f. SUMMARY

In closing, Dwyre drew upon these observations to offer a few suggestions to the three principal parties in the NATO marketplace: NATO and the European MOD's; the U.S. DOD; and the contract community.

(1) NATO and the European MOD's - Dwyre suggested:

- The increased use of multinational definition contracts as a method of developing increased contractor collaboration in the early stages of program definition;
- The adoption of a more uniform policy dealing with international contractors rather than relying on the circumstances of timing, the particular program considered and the national origin of contractors represented;
- Every effort to ease restrictions inhibiting the availability of program planning information, consistent with security, be made early in the program formulation.

(2) The U.S. Department of Defense - Dwyre suggested:

- Every effort be made to transmit the goals of RSI to all levels of DOD decision-making, especially to the MILDEP procurement offices where RSI is too frequently regarded as a nuisance, avoidable with the exercise of a little ingenuity;
- The clarification of the directions and incentives supporting RSI to make it "crystal-clear" to U.S. industry that lack of full consider-

tions of NATO RSI in proposals (even U.S. National procurements) may constitute a fatal flaw;

- The continuance of efforts to establish credibility with European industry, which continues to regard RSI as a U.S. initiative whose thinly-disguised purpose is really to increase sales of U.S. equipment in European markets.

(3) Contractors (principally in the U.S.) - I would suggest:

- We accept the nature of the NATO market with its similarities to and differences from our conventional markets (which requires a long-term commitment), with perhaps greater patience, if we are to enjoy success;
- The establishment of long-term relationships with NATO contractors who have been accustomed to working in long-standing consortia relationships and prize a history of management and program relationships transcending the one-shot joint efforts which characterize the U.S. teaming arrangements;
- The building upon these long-term relationships to develop a set of coordinated technology activities which recognize the legitimate aspirations of NATO contractors to share in the noble work offered by the NATO market.

B. NADGE

1. Introduction

a. The NATO Infrastructure Program and Early Warning

As with Communications, over the last 30 years NATO has come a long way in early warning and air defense.

In NATO's earlier years, air defense was purely a national responsibility. NATO members made their own defense plans with little or no coordination between neighboring countries. However, appreciating the fact that an air offensive would pay no regard to national boundaries, SACEUR, General Gruenther, instituted four allied air defense regions in the mid-50's. The previous year General Gruenther had also established the SHAPE Air Defense Technical Center (now called the SHAPE Technical Center) at The Hague, Netherlands to study the latest techniques in air defense.

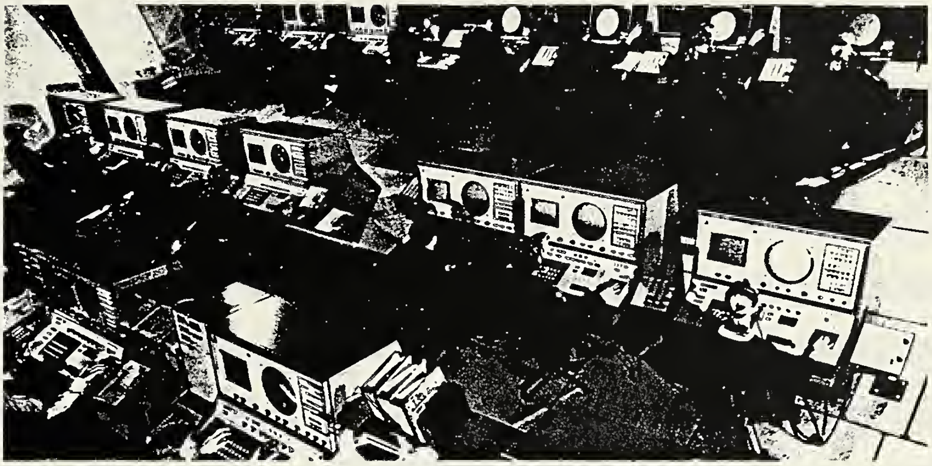
The first allocation of NATO Infrastructure Program funds in this area, in December 1952, was only to fill gaps in the coverage provided by the existing national early warning systems. This was followed by three years of studies to determine the kind of radar to be procured leading up to an approval in principle in December, 1955. It then was another three and a half years before the contracts were let (1955-1959) to a consortium of Compagnie Generale Francaise de Telegraphie sans Fil and Marconi's Wireless Telegraph Company for seven million pounds—funded for Slice VIII. The system was installed by mid-1962.

b. Planning for NADGE

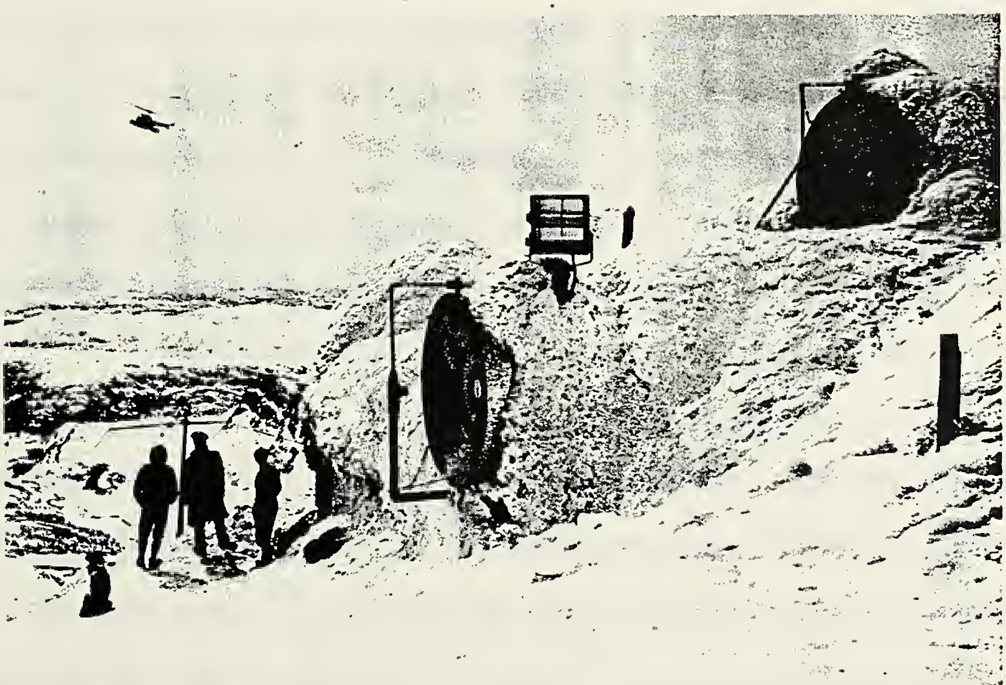
The NADGE program grew out of the Alliance need for creation of an integrated air defense system through a linking, modernizing, and supplementing of the existing national early warning systems. After Slice VIII's large, one time allocation for early warning radars, appro-priations for early warning facilities again shrank for several years until the early 1961 decision in principle to build the NATO Air Defense Ground Environment (NADGE) - whose cost was as of yet undefined— but with an initial commitment of $308 million, which amounted to 46% of Slices XII-XV.

The NADGE program dates back to 1957 when SACEUR, General Norstad, stated that the only realistic air defense for NATO would be a common integrated air defense. In the same year a fact finding mission was set up to work out an overall European requirement. The Military Committee (the highest body on NATO's military side) approved the basic concept in 1958, with the Council giving its approval in early 1961 for NATO Infrastructure Program (also referred to as common infrastructure) funding of the program. It had taken three years to convince the council that a requirement to modernize the system really did exist.

In March, 1962, the North Atlantic Council allocated $308 million for NADGE. However, in September 1962, the U.S. claimed the actual cost would end up being three times that—a sum for which the U.S. would not contribute its 30.85% NATO Infrastructure Program share.



NADGE – the largest electronic defense project ever undertaken – extends from the northern tip of Norway to the eastern frontier of Turkey, both bordering on the Soviet Union. Photo shows plotters at work before data display consoles in Denmark.



Radar sites in Northern Norway.

Meanwhile two groups were set up to study the technical and the managerial/cost aspects. One of these was the Ground Environmental Team of the International Staff (GETIS) which was primarily a technical team formed to assist with writing up the technical spcifications and calling for an evaluation of the technical proposals from industry. The other group formed was the International Ground Environment Subcommittee (IGESUCO, a special subcommitee of the Infrastructure Committee) whose prime function it was to supervise the budgetary side and decide upon the management structure.

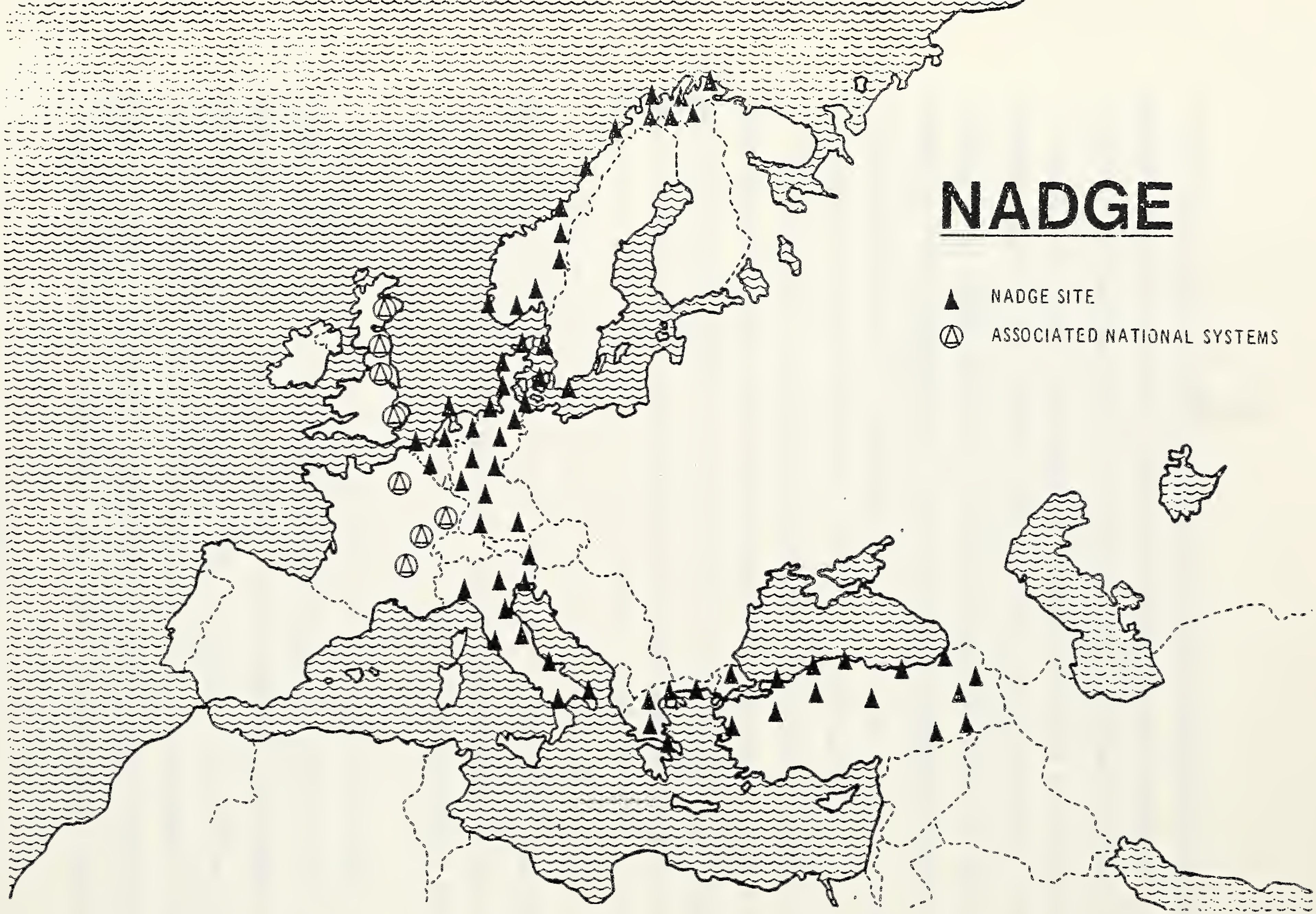
As the NADGE negotiations dragged on several nations—the FRG, Belgium and the Netherlands, went ahead with their own independent programs. These three countries had originally agreed to team up in 1958 to improve their air defenses, having formed the International Planning Group (IPG). Having given up on the inte- grated NADGE effort, the IPG went ahead and awarded the contract to Hughes in 1964, some two years before the NADGE contract was eventually awarded (the 3 countries were later reimbursed out of the IAU 110 million allocated for NADGE). This was later to give Hughes tremendous leverage over the other bidders. The IPG's mutual air defense system was later designated ADGE and included four underground command and reporting sites in the three countries.[95]

In 1963, due to the U.S. government's insistence that U.S. industry receive business equal to the U.S. government's share of funding (30.85%), the normal International Competitive Bidding rules were dropped.[96] This approach was then applied across the board to all other nations as well. It was decided to have several consortia compete for the project, with work allocated within each so as to have no effect ($\pm2\%$) on the individual national balance of payments (BOP).

Although this arrangement proved to be overly rigid and was to greatly complicate things for the contracting consortium, it can be credited with having suppressed some of the usual design squabbles among the national governments, which normally tend to call for systems and subsystems in which their manufacturers had a greater advantage. In November, 1963, the amount of $308 million dollars was established as a firm ceiling for the program (again due to Secretary of Defense McNamara's intransigence) and in the summer of 1964 a compromise agreement was finally reached on a new NADGE concept. The final system to be built was one which had been twice reduced from SACEUR's minimum requirement, due to funding constraints.[97] On the governmental side, an NPLO, the NADGE Organization (including a NADGE Policy Board (NPB) and a Management Organization (NADGEMO)) was set up to provide centralized program management, in coordinating the activities of the nine national host countries with whom NADGECO was to contract.

Basic specifications and a program plan then went to industry in September 1964, it being hoped at that time, that the winning consortium could be selected and contracts signed by mid-1965.[98]

At the Bidder's Briefing[99] in January 1965 General Robert M. Lee, Air Deputy to SACEUR emphasized that the basic NADGE requirement was for an air defense system having compatibility between all its different elements. However, as General Lee pointed out, such a compatible or "integrated" system need not consist of identical elements or subsystems. In fact, he continued, in order to meet all the requirements, both technical and financial, it would be necessary to take into account differences in target values, topography, vulnerability and availa-


NADGE
NADGE SITE
ASSOCIATED NATIONAL SYSTEMS

bility of active systems, threat differences, etc.—and this would lead to selection of a variety of pieces of equipment.

c. The Competition

Three U.S. led consortia were formed to compete for the NADGE contract (a fourth led by Raytheon was formed but voluntarily withdrew shortly thereafter). All three international consortia were set up with the zero BOP condition in mind.

The Hughes headed consortium, formed in January, 1965, also consisted of: Thomson-Houston (France); Selenia (Italy); Telefunken (FRG); Marconi (UK), and Hollandse Signaalapparaten (Netherlands).

The Westinghouse led consortium was also formed in January, 1965, and included: IBM France; IBM Italy; Decca Radar (UK); Siemens (FRG); and ACEC (a Belgian subsidiary of Westinghouse).

ITT led a third consortium, which had been formed in September 1964 consisting of: Litton Industries[100] (U.S.); Sperry Rand Univac (U.S.); ITT Corp. Europe (France); CSF (France); Elliot-Automation (UK); AEI (UK); and J. L. Keir & Co. (UK).[101]

After a year of dialoguing between NATO and the three competing consortia the finalized technical proposals were submitted on November 1, 1965. However, when it came time for the three consortia to submit their final bids several weeks later, all three exceeded the ceiling, and were therefore unacceptable. After

modifications on both the government and industrial sides the two remaining consortia resubmitted their bids; the IT&T consortia having dropped out in the interim. HUCO, the consortium headed by Hughes was selected the winner with a bid of $230,842,080.00 in June 1966. HUCO thus became NADGECO.

The $230.8 million was the equivalent of 82,443,600 pounds sterling; at this date an Infrastructure Accounting Unit (IAU) was still equal to one pound sterling as well as being equal to one Contract Payment Unit (CPU—a relationship which will be explained later). Twenty million of the IAU 110 million allocated to the project had been committed by NATO for other parts of the project. This involved IAU 10 million for smaller contracts that would be placed by the NPLO directly, IAU 10 million to reimburse the 3 IPG countries, and 1 million for the NPLO's cost of providing project management.

The nine host country-NADGECO contracts were signed by the end of the year (December 31, being the deadline) and work was begun officially on January 2, 1967.

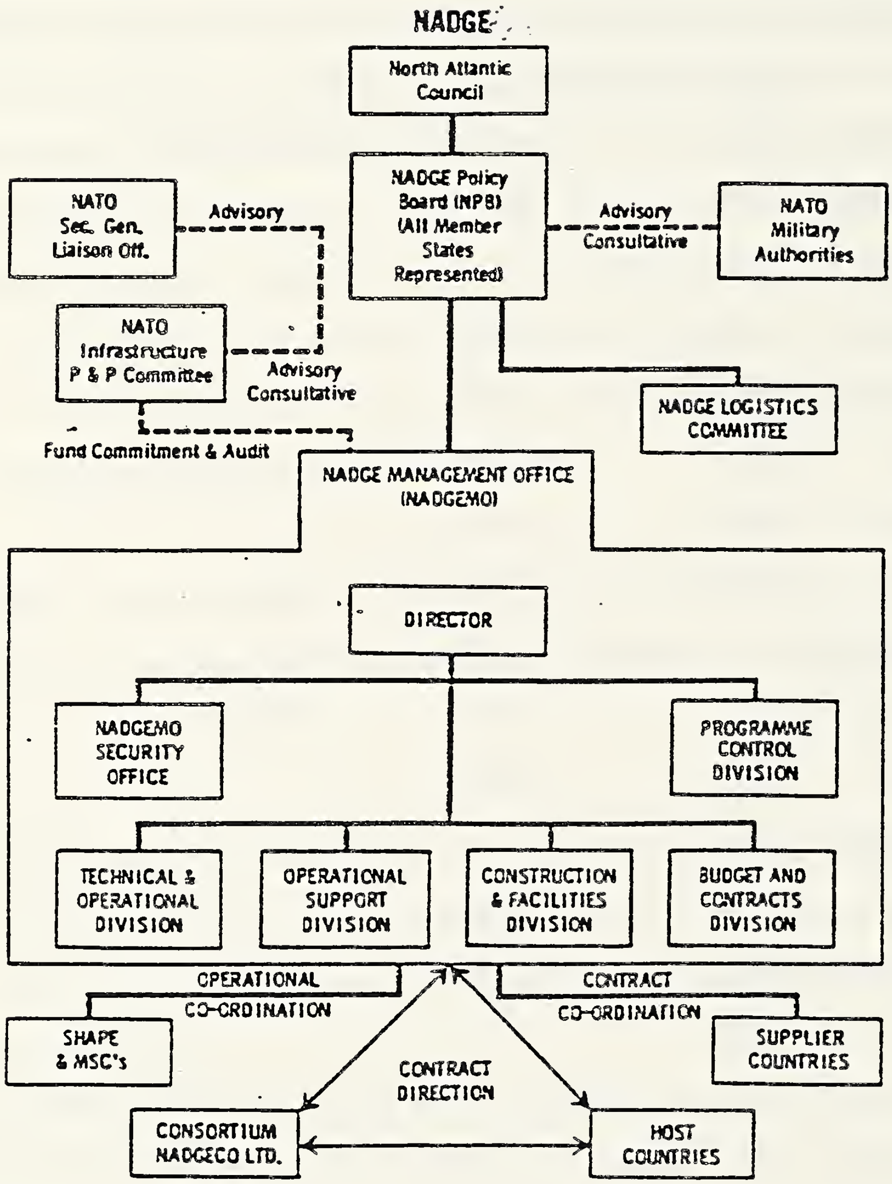
The last of the 84 radar sites and 37 control sites was completed in August 1973, with the last Final Site Acceptance Protocol's execution on November 26, 1974. The program was completed in six and a half years, instead of four, as originally stipulated.

2. Financing

The fourteen funding nations included all Alliance members, except the smallest one, Iceland, who has no armed forces and doesn't participate in the NATO Infrastructure Program. National shares for project funding and location of installations were distributed as follows:

Share of Funding		Share of Installations Among the 9 Host Countries	
Belgium	4.24%	2.45%	
Canada	5.51%	-	
Denmark	2.87%	8.53%	
France	12.00%	4.43%	
FRG	20.00%	18.53%	
Greece	0.67%	10.94%	
Italy	5.97%	15.85%	
Luxembourg		0.17%	-
Netherlands		3.83%	2.40%
Norway	2.37%	14.87%	
Portugal	0.28%	-	
Turkey	1.10%	22.00%	
United Kingdom		10.50%	-
U.S.A.	30.85%	-	

The UK's early warning system (UKADGE) is not part of the NADGE chain, but is interoperable with it.[102] However, in spite of this, the UK funded 10.50% of the project, with its industry receiving the same share of the contracted work.


NADGE
North Atlantic Council
NADGE Policy Board (NPB) (All Member States Represented)
NATO Sec. Gen. Liaison Off.
Advisory
Advisory Consultative
NATO Military Authorities
NATO Infrastructure P & P Committee
Advisory Consultative
Fund Commitment & Audit
NADGE LOGISTICS COMMITTEE
NADGE MANAGEMENT OFFICE (NADGEMO)
DIRECTOR
NADGEMO SECURITY OFFICE
PROGRAMME CONTROL DIVISION
TECHNICAL & OPERATIONAL DIVISION
OPERATIONAL SUPPORT DIVISION
CONSTRUCTION & FACILITIES DIVISION
BUDGET AND CONTRACTS DIVISION
OPERATIONAL CO-ORDINATION
CONTRACT CO-ORDINATION
SHAPE & MSC's
SUPPLIER COUNTRIES
CONTRACT DIRECTION
CONSORTIUM NADGECO LTD.
HOST COUNTRIES

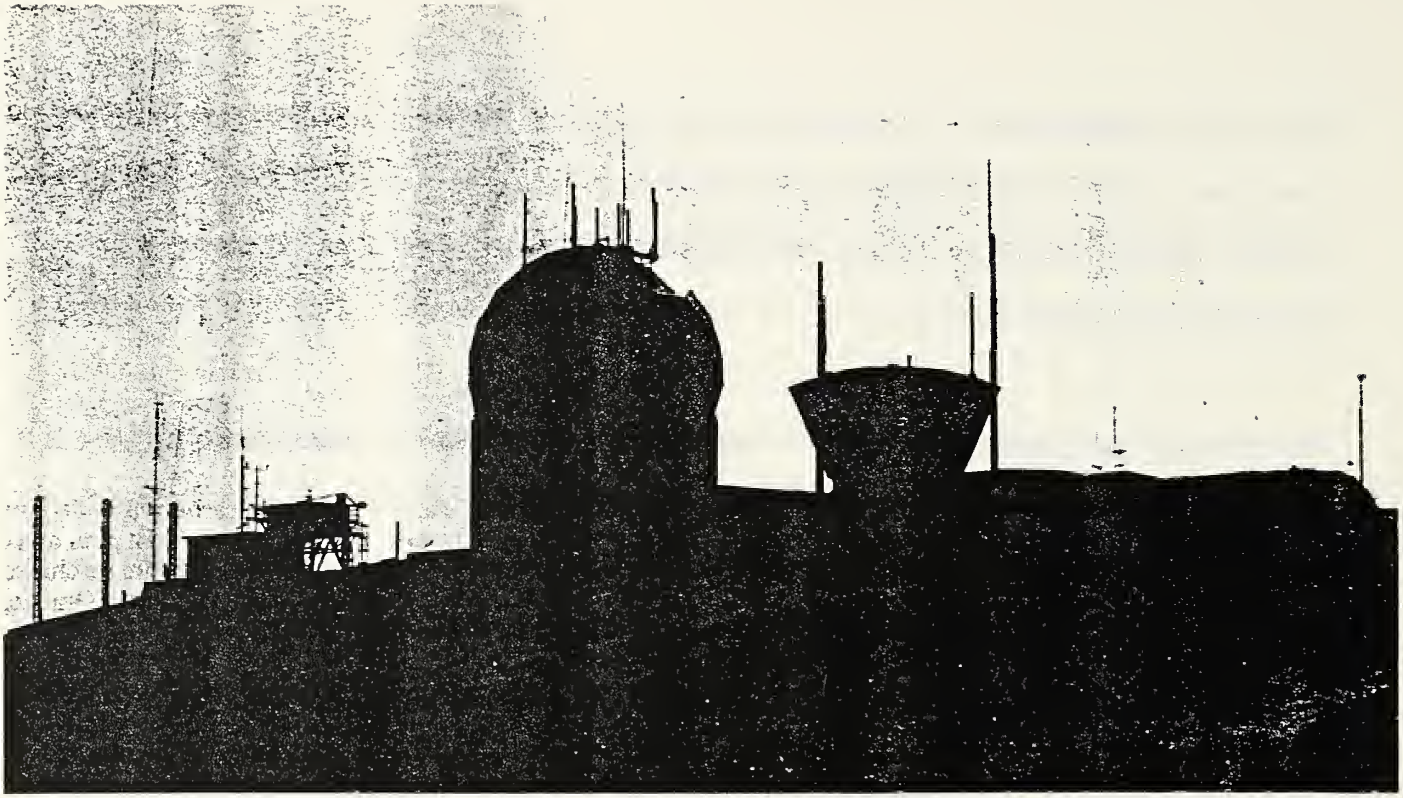
Due to the importance of an integrated approach to warning against air attack, France was also a major project participant. France is integrated into the system, however, only up to the point where reporting ends and the control of retaliatory devices begins.

The transfer of funds from the fourteen nations to the nine among them that were also acting as host countries was accomplished bilaterally within the usual NATO Infrastructure Program framework (as described shortly). However, NADGEMO, also acted as a host country, awarding some $30 million in assorted smaller contracts, which were outside of the basic contract package of $230.8 million.

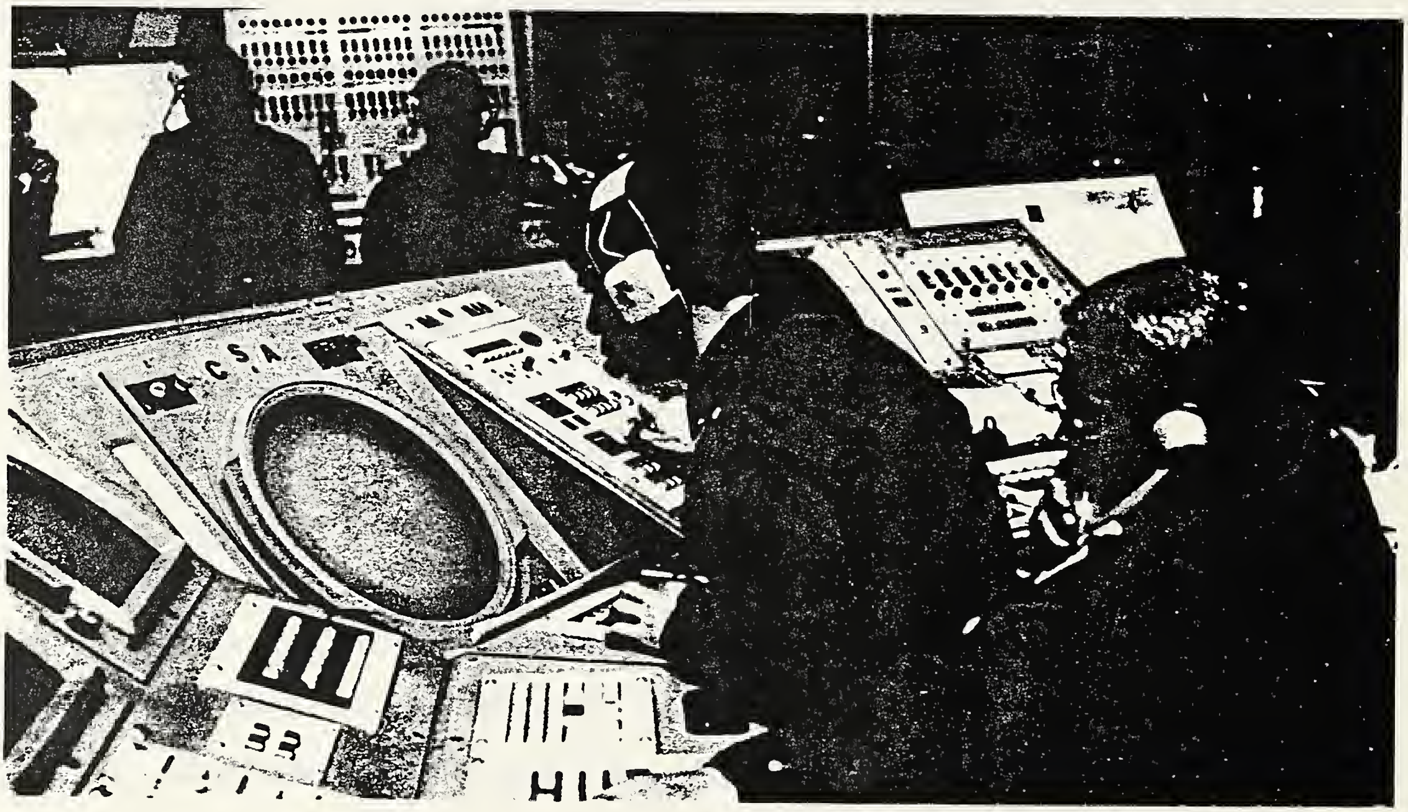
Another $28 million went to the 3 IPG countries—the FRG, Belgium, and the Netherlands—to reimburse them for the pre-financed work they had undertaken when faced with an early impasse in the alliance-wide NADGE program. An additional $19 million also went to the same 3 countries to finance their contracts to Hughes for Growth to Full NADGE—addition of certain items, extra visual display units, and a general increase in the capability required for the NATO system.

The final total amount of the nine NADGE Contracts ultimately became CPU 83,229,884; after additions of CPU 2,667,590 (primarily a system design change, plus a number of equipment and civil engineering additions), and deletions of CPU 1,881,306 (primarily tax adjustments).

As explained in the previous chapter, NATO itself neither holds nor administers the funds allocated to NATO Infrastructure. Through bilateral financial commitments among member countries, contributions are paid in advance quarterly, as



Source: Air Actualites



Source: Air Actualites

called for by each host country. The host country makes the actual payments, using the contributions from the other member contries, to which it adds it own as well. The role of the NATO Secretariat is to maintain a record of all these transactions, tracking each host country's account on the basis of advanced contributions paid and actual expenditures reported.

In the following quote from Dr. Robert S. Reed of Hughes, former NADGECO Vice-President and later President, this process by which funds flowed from the 14 funding nations to NADGECO is briefly described.

NADGECO negotiated the details of an annual finance plan with NADGEMO and the 14 contributing nations within the provisions of the nine contracts. These annual finance plans contained the earliest month, amount, currency and milestone achievement upon which NADGECO could base its invoicing. When the finance plan was approved, NADGEMO divided the plan into calendar quarters and provided the NATO Infrastructure Finance organization with currency amounts. NATO Infrastructure Finance then issued a quarterly call to each contributing nation for the currency payment required of that country. Each country, responding to that call made funds available in a bank account established in its country but available to be drawn upon by drafts signed by NADGEMO (on behalf of the host nation) and NADGECO jointly. Within the above parameters, NADGECO was free to specify various currencies as required by NADGECO to pay its obligations.[97]

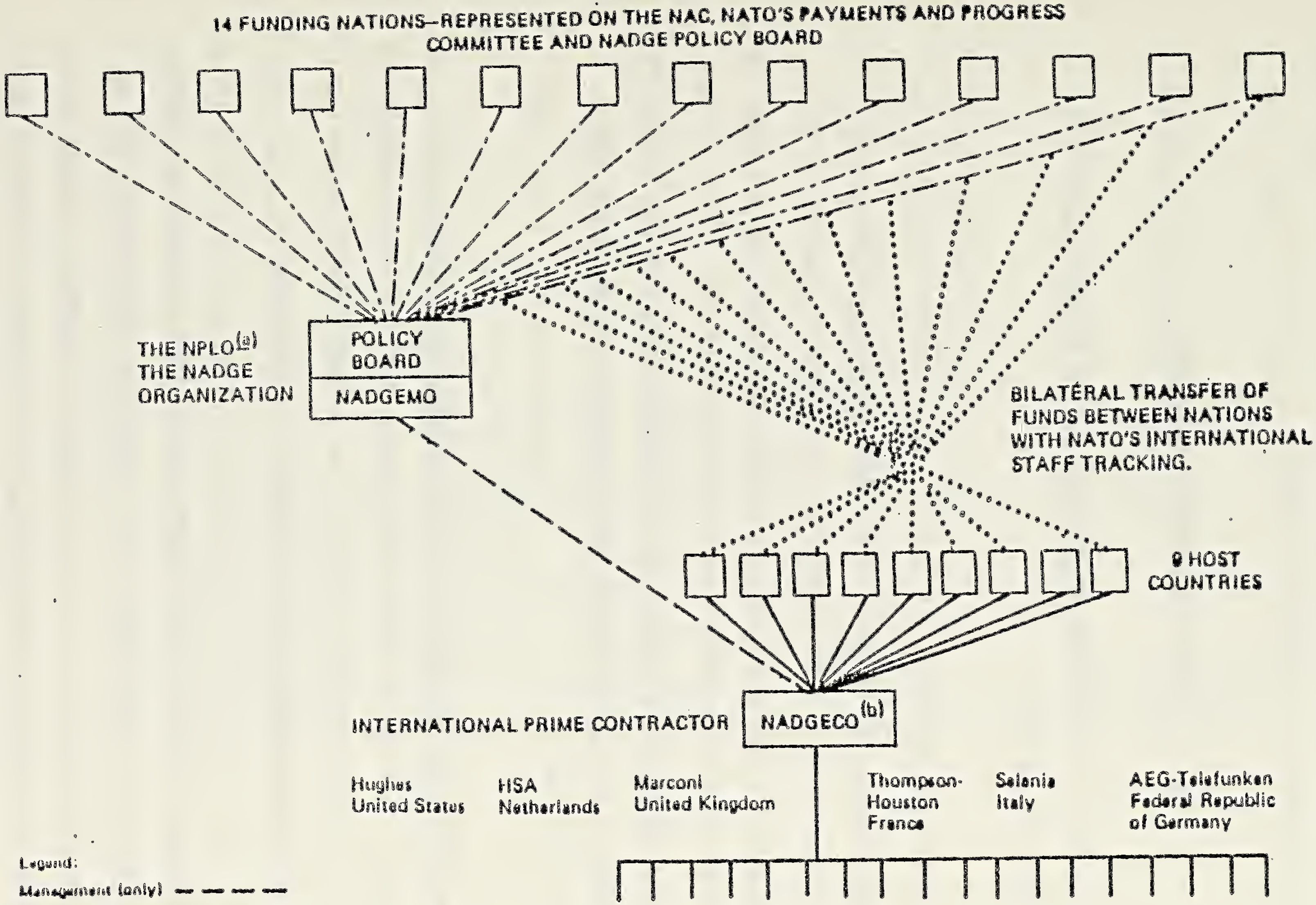
The unit of account, or yardstick against which the individual national currencies are measured within the NATO Infrastructure framework is the Infrastructure Unit of Account (IAU). Prior to the IAU the Pound Sterling was used, but the

Pound was dropped after its November, 1967, devaluation with its prior value (at that time $2.80 to the pound) being continued but no longer pegged to any currency. The IAU expresses real value that can be translated into a corresponding amount of each national currency at any given point in time—as of late 1979, this being equal to about $4.57.

It then became necessary to peg this real value to a unit specific to the project and reflecting the fluctuating value of the composite of 14 currencies required by the contractor. This redefinition of the unit of payment of the contract led to the introduction of the Contract Payment Unit (CPU) specific to this program. "The CPU is defined as the unit in which the contractual finance plans are expressed, namely the aggregate of the national currencies of the NATO countries in which the expenditures of the Contractor are made, frozen at the official NATO Infrastructure rates of exchange in effect on 15 December 1965...Because of national devaluations and revaluations, by the time final payment to the contractor was made, the aggregate CPU was equivalent to approximately 0.95 IAU."[103]

Being implemented under NATO Infrastructure rules which were by that time some 15 years old, the waiver of taxes and customs were not a problem for the NADGE project. Each country worked its own system as with any NATO Infrastructure Program funded project. In most cases this involved the MoD's programming funds to reimburse the national treasuries for those taxes which otherwise would have been applicable to the project. As we will see with the HELIP (European Improved Hawk), the F-16, and the NATO AWACS projects, which are outside of the

NADGE



Legend:
Management (only) — — — —
Contractual (and management) ————
Funding • • • • • • • • •
Policy — - — - —

(a) An NPLO-NATO production and logistic organization

(b) NADGECO co-owners and major suppliers

NATO Infrastructure bureaucracy, the implementation of this waiver of taxes and customs on an ad hoc basis is not quite as simple.

3. The Governmental Organization

As previously stated, the 14 funding governments set up an NPLO to provide centralized program management.

However, the industrial consortium, NADGECO was under contract to each of the nine host countries (the nine countries where the installations were to be built, in accordance with the NATO Infrastructure Program's usual practice). The NADGE Organization's role was to serve as the nine host countries' agent so as to provide centralized management for the inter-governmental effort, as had been the case with NHPLO for the NATO Hawk program and NASPO for the NATO F-104G Starfighter project. As we will shortly see, however, problems arose with regards to this relationship.

According to the NADGE Lessons Learned document, NADGE/D/3-5-01/215, dated November 14, 1975, it was due to 'political reasons' that the NADGE contract had to be subdivided into nine parallel contracts, one between NADGECO and each host country - each only taking effect once all nine had been accepted.

Moreover, as is common in NATO Infrastructure contracting, considerable responsibility for implementation was vested in the contractor, thus costing NATO in the end only some CPU 3.5 million for its contractual management, instead of a probable CPU 10 million plus an estimated two additional years of preparation.

The NPLO Charter of the NADGE Organization, C-M(65)70, spelled out the responsibilities between all parties.

For the NADGE Organization this involved:

(1) definition of technical characteristics;

(2) selecting the winning contractor;

(3) endorsing the contracting consortium's production sharing proposals;

(4) coordinating the member states' industrial and technical assistance;

(5) supervision and coordination of site selection and station construction, production quality control, installation, test and inspection procedures, and system checkout procedures;

(6) study and provide recommendations for the logistic support of the NADGE System.

Within the NADGE Organization, the usual NPLO organization pattern was followed. At one level was the NADGE Policy Board (NPB), consisting of one representative from each of the 14 participating nations, and having the responsibility of providing overall policy direction. (This meant that, in contrast to the NATO Infrastructure norm, the NPB replaced the Infrastructure Committee as the policy making body for the program.) As spelled out in the Charter, all decisions of

A NADGE Site at 10,000 ft above sea level in Eastern Turkey.

the NPB would be reached unanimously.[104] In the event of persistent disagreement within the NPB, the question was to be submitted to the North Atlantic Council for decision. The NPB was also empowered to establish committees of experts (Ad Hoc Working Groups), consisting of government representatives and being delegated such powers and responsibilities as the NPB determined.

At the other level was the NADGE Management Office (NADGEMO) whose Director, French General J. M. Accart, was responsible for implementing the NPB's decision. NADGEMO's contractual responsibilities were:

(1) prepare and send out requests for proposals, and work with the competing consortia in drawing up implementation plans;

(2) ensure by the appropriate legal means that NADGECO remains responsible for seeing that the equipment is interoperable;

(3) prepare, in accordance with the NPB and in liaison with the host countries, those conditions to be mandatorily inserted in the host country contracts, as well as those administrative and other rules to be inserted;

(4) provide the host countries with the necessary assistance in drawing up of their draft contracts for approval by the NPB;

(5) follow the progress of negotiations between host countries and NADGECO;

(6) coordinate the activities of the national authorities, in their host and/or supplier country roles.

The nine states acting as host countries had responsibility for:

(1) the drawing up, in cooperation with NADGEMO, of: supply, construction works, and installation contracts; the forwarding of these contracts to the consortium; and by the signing of contracts as approved by the NPB;

(2) final acceptance from the contractors and the taking over of facilities (though NATO retains the right of compensation for any residual value);

(3) ensuring the financial coverage of contracts signed with NADGECO, by obtaining these funds through the Infrastructure Payments and Progress Committee from the 14 funding member states.

The 14 nations, each acting as a supplier country to some extent, had responsibility over production within its own territory for:

(1) production quality control, and;

(2) factory inspection of equipment, under conditions agreed upon by the NPB.

As one might expect with such a complex one-time project management structure many problems arose, especially in the coordination of the nine host countries and the NATO project office, NADGEMO. As we'll see later in this sub-chapter

though, NADGEMO had been able to serve effectively as the agent of the nine host countries in providing central program management up till contract award. After this point the contractor found itself locked into a fixed price contract while dealing with a fractionated government consortium, a less than firm design, and a multitude of other problems.

With NADGEMO's authority seriously constrained in the post contract award phase, General Accart's job was not an easy one. In such a highly unstructured defense contracting environment, i.e. one outside the standard national framework the management style of the director (or project manager) can have a significant impact on the course of the project, such was the case here.

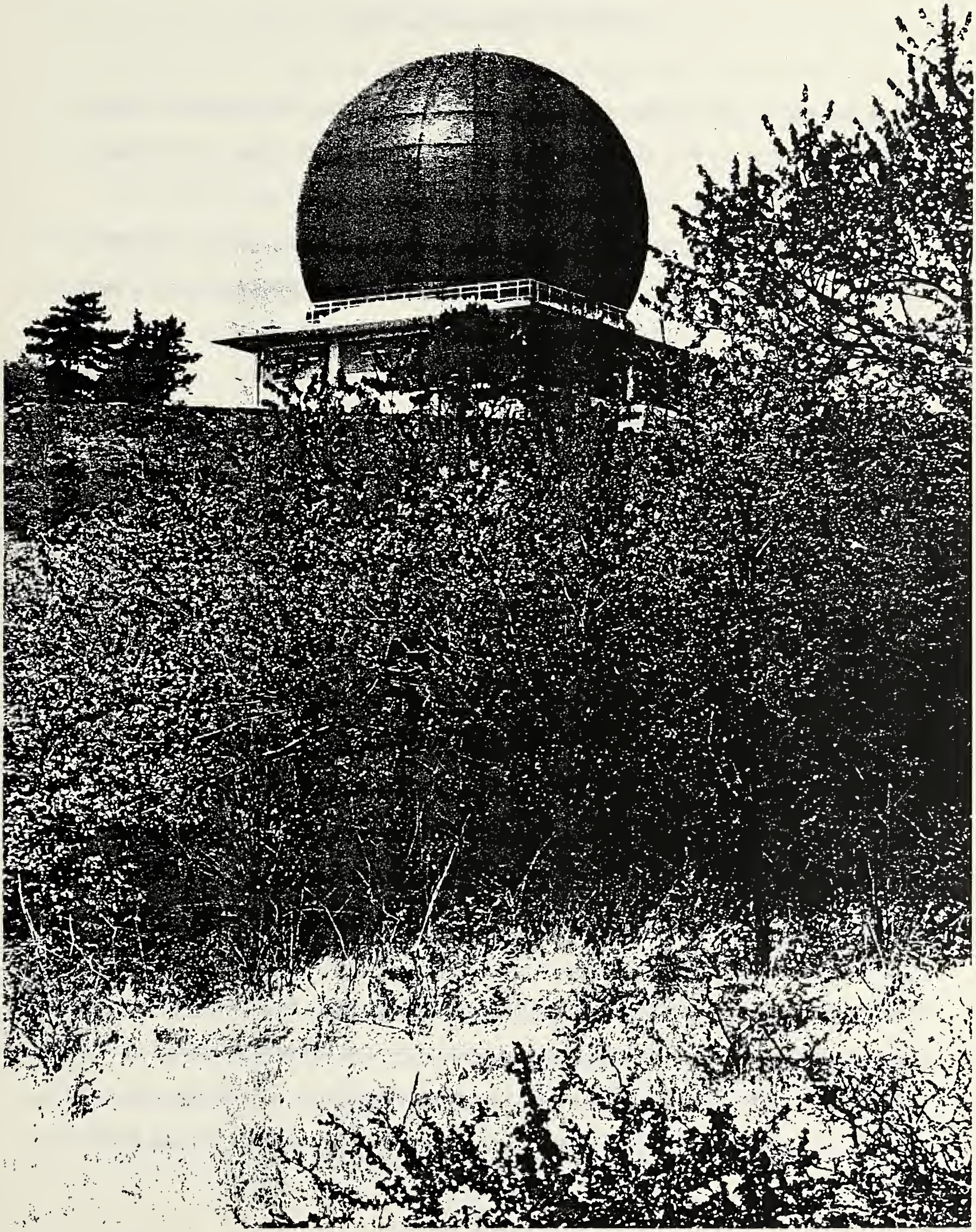
T. J. Loveland provided the following description of Gen. Accart.[105]
... General Accart's personality certainly contributed to that of NADGEMO. He was a charming Frenchman who was well-loved by everyone who came in contact with him. Certainly by U.S. standards he was not a manager; he did not believe in a systems approach to something and could not understand why the U.S. insisted on having test specifications and objectives. He continually cited his experience with Marcel Dassault in designing the Mirage, where one would call the other each morning and asked what they wanted to test that day, and proceeded to do it. He did help greatly, however, in establishing a decent cooperative atmosphere between the NATO agency and the contractor, and I believe was a major offset to some of the miserable relations which developed between the two organizations at some of the lower technical levels.

Robert S. Reed (previously NADGECO President) expanded on this:

I agree to a large extent with Mr. Loveland's observations. I would like to add that Gen. Accart held too long to the close, almost personal approach to management once it became obvious that the scope and complexity of the project made that management technique unusable. Only when it was generally accepted that only the accomplishment of the essential elements of the job could act as the central controlling factor for all activities and everyone involved did the program move forward successfully. Unfortunately this came after several years of strong expressions of personal and national preferences, particularly in the technical areas, a factor which contributed substantially to schedule delays and cost increases. Gen. Accart could not deal effectively with the "independent" members of his organization for a number of reasons -- he had little control over their selection, literally could not fire them, and could not dissuade the nations from interferring. I must hasten to add, however, that Gen. Accart brought to the program a level of personal integrity unsurpassed by any others associated with the project.[106]

As we'll see in the subchapter covering the NATO Hawk project in Chapter 7, the management style of the Director of the NATO project office, the NATO Hawk Management Organization, seriously impacted the program as well. With Hawk

however, due to a number of other contributing factors, the authority of the NATO project office was greatly increased, vis-a-vis both the associated national authorities and the international prime contractor. This radically altered the original planned balance between the parties within the project management structure for NATO Hawk. NADGE also involved a shift in this balance, but one that evolved along different lines.



Source: Air Actualites

4. The Contractor - NADGECO

During the early 60's Hughes Aircraft Company was gradually carving out for itself a position in the air defense field. Having opted to go into the air defense business later than other U.S. firms, Hughes was faced with a U.S. market that was pretty well locked up. Consequently Hughes looked overseas for possible points of entry. They targeted the Swiss and Japanese competitions of 1962-3.

From being practically a non-starter among the original group of ten firms competing for the Swiss contract, Hughes found itself selected to be one of the 3 finalists, but as a poor third only. Even though Hughes had no experience in the area the Swiss were intrigued by several of the concepts in the proposal. In the end the Swiss chose Hughes. The Swiss had been impressed by Hughes' software capability and the continuity and commitment of the Hughes team they had been dealing with.

The Japanese also selected Hughes shortly thereafter. The following year, 1964, Hughes was able to capture its third air defense system contract from the International Program Group (IPG); the Belgian-Dutch-German break-away program from the stalled NADGE effort.

Finally came the selection of the Hughes led consortium in mid-1966, for the NATO Air Defense Ground Environment project, thereby becoming NADGECO. NADGECO's area of responsibility was the production and installation of "...the equipments selected and handing them over in working condition to the host

countries and, in general, for implementing the NADGE Plan in a coherent manner so as to ensure the essential interoperability specified in the operational equipment in accordance with the relevant quotas of each country and the balance of payments provisions..."[107]

Also, instead of having the system designed prior to the call for bids by a systems management organization (an approach that could have taken up to 10% of the available funds), system design had been left primarily in the hands of the contractor.

In the period between the first and second round of bidding for the NADGE contract, HUCO (the Hughes led consortium of six firms, shortly to become NADGECO upon source selection) had shifted from a loosely knit consortium—one in which each firm assumed the responsibility for its assigned work, all the way to system sell off—to a much tighter one. The six firms decided to form a separate corporation (established in the Bahamas for the usual tax reasons), to negotiate and implement contracts with each of the nine host countries. The corporation brought project management, system engineering, finance, contracts, planning, site preparation and construction, all under one roof, which went a long way toward bringing the consortium's price down sharply for its second bid. This also involved several other improvements such as intraconsortium and outside competitions on hardware, plus, with the decision to approach NADGE from a project standpoint, the creation of joint teams to move from one country to another to maintain the smooth flow of work. Hughes final fixed price bid of 82.44 pounds ($231 million) beat out the Westinghouse consortium's bid of 87 million pounds ($243.6 million).

NADGEMO had provided the focal point for a high degree of cooperation in the initial preparation of contracts. This was followed by the traditional open negotiating sessions with each of the 9 host countries. The national negotiations were preceded by a series of meetings at NATO Headquarters to agree on common terms and conditions, which helped to significantly reduce the negotiating schedule.

Headquarters for the Hughes led consortium was set up at Feltham, within ten minutes of London airport, from where communication and transportation links were excellent. The six companies provided 300 engineers and technicians to staff the NADGECO Headquarters, with another 1000 men in the field supervising construction and installation. The percentage of ownership in NADGECO by its six shareholders was:

Hughes Aircraft Company (U.S.A.)		34.85%
Thomson - Houston (France)		20.42%
Selenia S.p.a. (Italy)	15.67%	
AEG - Telefunken (FRG)	14.01%	
Marconi Company Ltd. (U.K.)		10.05%
Hollandse Signaalapparaten (Netherlands)		5.00%

In addition to NADGECO's 'in-house' activities, these six were also the primary equipment suppliers. Other subcontracts were required from the other eight funding nations as well, to provide equipment, and perform civil engineering and construction work, so as to fulfill the program's BOP requirements.

- Thompson Houston supplied the major warning radars with some having been manufactured under license by AEG-Telefunken.

- Marconi was responsible for height-finding radars and improvements to existing radars.

- AEG Telefunken, in addition to its licensing agreements with Thomson Houston, provided most of the video links.

- Selenia contributed large numbers of data displays plus the video links for Italy.

- Hollandse Signaalapparaten B.V. was responsible for the gap-filler radars, two-dimensional extractors, and modifications to existing display systems.

- Hughes, in addition to overall management, provided the computers—the heart of the whole system.

The objective in setting up the industrial consortium, was that NADGECO, was to: (1) provide for a sharing of responsibility in making this a truly multinational program, one with which all the primary member firms and states could identify; while (2), still allowing for a fully integrated approach to project management. Two opinions were expressed as why the six firms were able to successfully pull off this tight rope walking act. According to Loveland, in actuality it was Hughes who carried most of the responsibility for the program, though not having complete authority (i.e. needing to obtain board approval). Though this

arrangement was basically cosmetic, it was still satisfactory to the other firms.[108] Hughes, who provided the President, Dr. F.P. Adler,[109] the Vice-President, Robert Reed,[110] and several of the more important officers, pretty much ran NADGECO. Reed however provided us with a different explanation.

I would like first to make the point that the partnership relationship that existed among the six NADGECO companies was far more than just an image. It existed in fact and primarily as a result of a dedication on the part of management and technical personal at NADGECO to make it work. The personnel from the six companies were fully integrated in all functions and at all levels at NADGECO. We bore constantly in mind that success was possible only if we managed to a defined task, an agreed upon schedule and an approved budget, and this approach left little room for any approach other than the cooperative one. We also reminded ourselves frequently that if the six companies ever began to feud with each other, failure was a certain result.

In support of the partnership approach, personnel selection was made with the prerequisite (among others) that those who came to NADGECO must feel comfortable in an international environment. Adherence to this policy brought very satisfactory results.

Coupled with the above was a willingness of the other five companies to give meaningful recognition to the vastly greater Hughes experience as a systems contractor. This is not to say that the other companies did not have such experience, but we all recognized that it was relatively limited when compared to Hughes.[111]

In either event, the successful result can be contrasted with the experience of the French firm Thomson-Houston in its leading role in the inter-firm company (SETEL) managing the NATO Hawk project.

As one might deduce from the U.S. funding share and Hughes ownership share, Hughes was also NADGECO's major supplier.

Although they were considerable constraints on the contractor, the projects work-sharing requirements (no balance of payments effects, ±2%) were completely fulfilled through a combination of subcontracting within the NADGE Project (and including only one case of second sourcing) as well as supplementary purchases by NADGECO's six owner companies under side agreements.

NADGECO was also obligated, under the terms of the contracts, to train sufficient personnel for 1 watch out of the 3 needed to provide a full 24-hour coverage.

These initial trainers were then to instruct the personnel for the remaining 2 shifts at the expense of the host country. The official language for all training courses was English—all equipment for NADGE system being labelled in English, regardless of the country in which it was installed.

On this same point John Marriott made the following observation in the Jan-Feb 1970 issue of <u>Aerospace International</u>. "Training the men from the more technically sophisticated countries is not too difficult, but a problem arises when dealing with personnel of those nations whose standard of education is not of

the highest. NADGECO anticipates that it may be many years before its own skilled engineers can be replaced by enlisted maintenance men in some areas."[112]

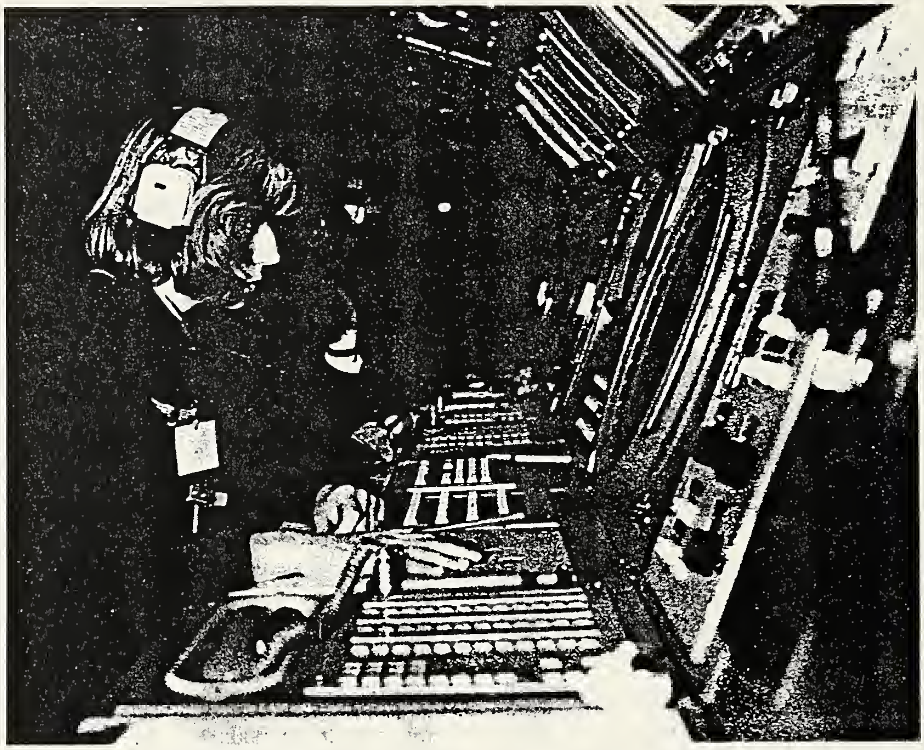
Even though the program itself, as it later turned out, was not terribly profitable[113] for the six owner companies of NADGE, there was considerable follow-up work for which they were well positioned to compete. This is especially the case for Hughes which has since cornered as a sole source, most of the work. In late 1973 the first group of NADGE follow-on contracts were signed with two companies of NADGECO's follow-up consortium, Eutronics—Hughes and Selenia. These improvements of the NADGE system through 1976 alone included:

- 4 new sites, as well as improvements of 3 existing sites in Greece by two subsidiaries of Hughes (HASI and AESI);
- Upgrading of 3 sites in Turkey by Hughes (HASI);
- Upgrading in Italy by Selenia with Hughes (HASI) as subcontractor;
- A new site in the Netherlands with radar provided by Thomson—CSF.[114]

Robert S. Reed of Hughes provided the following description of the follow-on Eutronics consortium.

"Eutronics is currently performing what can basically be called a marketing function, providing a centralized coordinated body of representatives of the 6 NADGECO consortium members and acting as communication links with the parent companies for purposes of developing technical proposals, cost estimates, etc. In addition, personnel associated with Eutronics are performing studies related to the integration of the NADGE system with other air defense systems e.g. NATO

AWACS with NADGE via NAEGIS.[115] Since the basic concept of Eutronics assumed that the parent companies would retain the technical resources in-house rather than assign them on a permanent basis to Eutronics, the level of activity at Eutronics has always been relatively low."[116]



Source: Air Actualites

Source: Air Actualites

5. System Design Problems

Stemming in good part from NADGEMO's limited authority vis-a-vis the nine host countries, there were other areas in which system design problems arose. In the division of labor laid out above, given the constraints, one sees a complex, yet fairly rational balancing of responsibilities between the international and national government agencies, and the prime contractor. However, NADGEMO's task of providing a certain degree of centralized decision making, so as to maintain the system's integrity, was seriously eroded after contract award by the independent approaches of the nine host nations, thus greatly complicating the contractor's carrying out of his allotted tasks.

As in other NÂTO programs where a NPLO served as the international focal point for a multinational procurement effort (e.g. Hawk and F-104G), the nine host nation contracts were based on a common contract originally drawn up by the NPLO's management organization (which in this case is NADGEMO) but also included additional national clauses. "Although many of these national provisions were required by construction codes and regulations in the various countries, some were dictated by the host nations' differing aspirations for air defense operations supported by the NADGE system. Thus, the nine contracts were not identical and the contractor was required to deal with nine separate contractual authorities under an effort at standardization and integration by NADGEMO's central authority, which however, was, in turn subjected to the detailed direction of the NADGE Policy Board."[118]

First, approval of the detailed system design report (SDR) drawn up by the contractor, took a considerably longer time than had originally been expected to obtain approval from all nine host nations and NATO. This is due to equal weight having been given in the NADGE Contract to the performance/operational specification originally outlined by NATO and upon which the bids had been based, and to the contractor's final technical proposal. Some parts of the SDR had still not been approved at the time of the installation and test of the first NADGE sites in 1970-1971. Secondly, lack of prior system design also required NADGECO to design the interfaces between equipment during implementation, even though the system had originally been conceived as consisting of off-the-shelf equipment. And due to the lack of common understanding over contractual requirements between NATO and NADGECO, some of the interface arrangements were especially problematic.[119]

A third aspect of the SDR where difficulties arose was that of software requirements which were more detailed than had originally been foreseen by NADGECO. The negotiations that ensued between NADGEMO, the host countries, and NADGECO led to the software requirement not being firmly established until the third year of contract performance. And a fourth problem area was that, although the contractor had responsibility for the successful operation of the system, he did not have the authority to design the details of the system, having to obtain approval at both the national and international levels.[120]

However, in spite of all this and the numerous other problems that arose which will be treated in the following sections on 'lessons learned' and the contractor's 'request for equitable adjustment', NATO obtained an adequate air

defense system, considering the price, and one which is serving as a base on which further improvements are being made, while sustaining a cost overrun of only 2.6% over the original $308 million (IAU 110 million) allocated in the early 1960's.

6. Settlement of NADGECO's Request for Equitable Adjustment of the Contract[121]

In 1970, NADGECO Ltd. went into the red, the whole project having begun to look like a potential disaster. NADGECO agreed, however, after some reflection, to finish the project. Liquidity was maintained through the deferring of the payments due the six owner firms on their subcontracts, as equipment suppliers.

In April 1971 NADGECO's owner companies approached the Secretary General of NATO with a request for additional payment under their fixed price contracts. In November, 1971, the NPB formed an Ad Hoc Working Group to receive the Contractor's detailed presentations, carry on a dialogue with the contractor, and eventually, prepare a report for the member states.

The contractor's request for a settlement on an amicable basis was for CPU 14 million. This figure was based on both sides mutually sharing the responsibility for the contractor's loss of CPU 28 million (a loss of CPU 20 million, plus the loss of anticipated profit-figured at 10% of contract price - of CPU 8 million). Pending a settlement (preferably amicably, and if not, through arbitration) the contractor would continue to complete its contractual obligations.[122]

The contractor's request for equitable adjustment of the NADGE contracts was based upon five underlying assumptions contained in its May 9, 1966, proposal. NADGECO's June 5, 1972, Bid Assumption Report listed them as follows:

(1) The accepted proposal clearly established the responsibilities of each of the contracting parties;

(2) The 9,000 page proposal provided a firm technical baseline, with which such parallel program activities as the refinement of specifications, the manufacturing of equipment and civil engineering design could be carried out from the beginning so as to satisfy the NATO schedule;

(3) that there would be a continuation of the low inflation patterns of the early 60's—there being no inflation clause;

(4) that in view of the numerous host country governmental agencies involved that there would be centralized program management with decision making authority;

(5) that there would be the appropriate timely response to NADGEMO and host countries to program needs.

After having received from NADGECO the series of documents presenting its position, which were submitted through second half of 1972 and into early 1973, the Ad Hoc Working Group published its Final Report in November, 1973, on its analysis of NADGECO's request for relief. Mindful of the very real danger of a leak

of any information to the Contractor pertaining to admission of fault on the part of either NATO or any member nations, and its possible future use against them if arbitration was ever resorted to, the Final Report was highly defensive in nature. It refuted most of NADGECO's claims, and where there was an admission of fault, the report instead stated only that it was a possibility.

Realizing that a transmittal of the Final Report by itself would likely result in the NPB members being instructed from their capitals to reject the Contractor's Request, it was decided that the capitals had to be simultaneously advised that the Final Report contained the truth, but not necessarily the whole truth.[123]

It also recommended avoiding lengthy discussions of each of NADGECO's individual contentions, with an early settlement being strongly desirable. The Ad Hoc Working Group suggested that some payment to the contractor would be reasonable, as recognition of excellence of his overall performance, in spite of the numerous unforeseen difficulties faced. The Ad Hoc Working Group therefore suggested that, although NATO could not accept responsibility for a system delay, a concept could be developed whereby NATO could accept financial responsibility for part of the two and a half year delay in the completion of the contract as well as abnormal economic escalation.[124]

At a briefing specially organized to handle the sensitive nature of the Final Report[125] the leader of NADGEMO's evaluation team suggested to the 14 funding nations that if arbitration did result, NATO and/or the individual nations might be vulnerable to NADGECO's contentions on the delay caused by a lack of

effective central authority, and the exceptional economic escalation experienced during contract performance, as well as considerations of 'force majeure'. He suggested that the contractor be compensated for the abnormal price escalation over the contract period of four years (figured at CPU 2.5 million (1973), and half of the escalation occurring during the extra two and a half years (CPU 1.25 million). For the lack of central program management, he suggested compensating the Contractor for half of the cost of running NADGECO's headquarters in Feltham, U.K., for the extra two and a half years (CPU 1.5 million). Therefore, a total of CPU 5.35 million was suggested as the settlement figure (no figure was given in NADGE/D/3-5-01/215 for considerations of 'force majeure').[126]

After several months all NPB members had received instructions from their respective capitals. Agreement was unanimous that NADGECO should receive some financial consideration, but, with wide variations for the figure involved. Concensus was reached, however, shortly thereafter on a settlement figure of CPU 5,631,579 (or $17.8 million) which was presented to the contractor in July 1974, as a 'take it or leave it' offer. This came to some 40% of the Contractor's original request of CPU 14 million. The offer was 'take it or leave it', due to the impracticability of a body such as the NPB attempting to carry on negotiations, given that 14 sovereign nations would have to agree unanimously to every figure. The offer was accepted by NADGECO, and both parties thus avoided the costly and time consuming process of arbitration, while being able to continue their close cooperative relationship.

Once having decided to go ahead with the project, the contractor had lost considerable leverage vis-a-vis the customer(s). There were two factors, however,

that offset this weakened position and eventually led to the settlement on a central basis. The option or recourse to arbitration, and the contractor's political muscle in the key funding nations.

NADGECO could have gone to arbitration on a host nation-by-host nation basis if forced to, but fortunately the issue was resolved centrally. Even though NADGECO never had to actually resort to arbitration in any of the nine host countries, as was pointed out by Robert Reed, the fact that the option existed, no matter how messy it would have been—and the contractor made it clear under no uncertain terms it was willing to resort to it—proved to provide sufficient pressure. The customer knew the contractor meant business, and the prospect of an escalation of the dispute was too distasteful.[127]

The other factor of importance, one that especially contributed to the reaching of this rather awkward settlement, was the broad based political support NADGECO (and as such, Hughes, as the lead firm) was able to muster through its member firms. This is one advantage that such a multi-company prime would have in dealing with a multi-government customer, over the more typical prime contractor consisting of one national firm (as in HELIP, F-16, AWACS) with all other nation's firms participating as subcontractors.

And as stressed by Robert Reed, "NADGECO received a lot more favorable attention than otherwise would have been the case, through the European firms going to their respective governments. There were six companies bringing pressure to bear. Boeing must bear that in mind (vis-a-vis NATO AWACS). Boeing can't just

go in as a big American company and expect an adequate response. A lot of people tend to ignore this—U.S. firms with their alligator complex."

Naturally, this option of a multi- or -single firm prime is severely constrained for any given project. Though an option for HELIP, it was much less so in the case of AWACS and the F-16 simply due to the particular nature of the systems and projects as a whole (e.g., unilaterally developed, dominance of one nation among the customers) unless of course, some sort of multi-firm licensee had been set up to act as prime, with the U.S. licensor also having a majority share in the licensee, but this was never seriously considered for the F-16 and AWACS projects.

7. Lessons Learned - Part 1

The program's package of lessons learned, was covered in detail in a NATO Report dated 14 November, 1975 (NADGE/D/3-5-01/215). The report drew to a considerable extent upon what NATO felt were the stronger points contained in the Contractor's documentation contained in his Request for Equitable Adjustment of the NADGE Contract (a condensation of which follows in section 8). The report covered the following 17 points:

(1) The need for sufficient centralized authority to be vested in the designated management office and the need for a single contracting authority;[128]

(2) The need for more flexible BOP provisions (say ±25%, but not ±2%);[129]

(3) The need for allowing the contractor greater latitude in the detailed implementation, if he is also to accept responsibility for performance;[130]

(4) The need for the central Management Office and/or the contractor to verify the condition of national equipment before it is turned over to the contractor;[131]

(5) The importance of having previously deleted the clause requiring the contractor to pay for liquidated damages for any delay, due to the complications that later developed;[132]

(6) The necessity of defining the exact content of existing installations that are to be modified by the contractor, so as to establish a dependable guaranteed baseline;[133]

(7) Proper assurance should be made for timely provision of purchaser-furnished information;[134]

(8) The need for a more detailed design at an earlier stage so as to avoid costly redundant testing;[135]

(9) Training programs should be adequately tailored to the needs of each host nation;[136]

(10) Firm financial responsibility for logistics support of a system should be established at the programming stage;[137]

(11) Due to severe funding constraints some initial requirements had to be deferred, with there being a resultant over emphasis on hardware, as opposed to software. In the future requirements should be established on a more balanced basis;[138]

(12) The necessity of providing for an overlapping of the implementation and follow-on management organizations;[139]

(13) The necessity of including an adequate escalation clause in the contract (the program having started toward the end of an era of low inflation rates);[140]

(14) The value in establishing a central treasury;[141]

(15) The need to limit the quarterly calling up of contributions from the 14 funding nations to the sum of the payments which fall due, especially in a period of widely fluctuating exchange rates;[142]

(16) The advisability of a continual stream of milestone payments,[143] but setting a minimum payment of at least IAU 1,000 each—in the NADGE program they were sometimes as low as IAU 100;[144]

(17) Only five countries agreed to hold funds appropriated to the NADGE Program in term accounts in commercial banks. In the future all funds should be placed in the NPLO's central account, which is a juridical entity not subject to prohibitions of national laws applicable to their own agencies.[145]

Robert Reed, NADGECO President, contributed what he felt were several additional lessons learned of the NADGE experience.

One has already been mentioned—that of the importance of the support that co-equal partners can provide in working with respective national governments for the timely resolution of particularly difficult contractor-customer problems as was the case here, with the post-contract settlement.

Another one offered by Reed was that NATO seriously consider creating a permanent cadre of procurement personnel. Unlike the perennial recommendations that appear from various quarters for some sort of a supranational procurement agency or pooling arrangement to rationalize the allied procurement efforts, the idea here is much more limited—and therefore practical—i.e., to set up an organization that can assume responsibility for procurement once some ad hoc group of nations decide on a given project. Such an outfit would not decide who buys what from whom. Once nations have delegated responsibility to their representative on the BOD of such an organization to protect their sovereignty while wearing a NATO hat as well, they would be then able to exercise their sovereignty more efficiently vis-a-vis the procurement function. Such an organization would be along the lines of the NATO Maintenance and Supply Agency (NAMSA) in Luxembourg for follow-on support. No sovereignty is really ever surrendered in the process; the nations involved in given projects just decide on tapping certain of the procurement services offered, and the degree to which they will delegate the management of these. As is true of setting up any new organization, with the current state of affairs, it becomes an exercise in confusion and inefficiency each time around. It takes time to build up confidence;

begin to establish relationships; figure out how to approach negotiations; establish regulations, procedures, practices, and so forth. Such a procurement service would definitely help to reduce much of this learning curve.[146]

The following three lessons learned are also noteworthy.

One, as shown by the NADGE project, agency relationships between national and multinational procurement authorities are highly susceptible to destabilization. In this particular case it involved the erosion of the intergovernmental project offices central management authority during the post-contract award phase vis-a-vis those 9 among the 14 funding governments that also acted in the capacity of host countries. This evolution greatly complicated the task of the contractor who, after having been contractually guaranteed that NADGEMO would be provided with central management authority, found itself locked into a firm fixed price contract and compressed schedule while dealing with:

- What turned out to be a yet to be stabilized design and set of testing requirements since what had been one customer during the bidding phase fragmented into nine with a tendency to renegotiate at almost every turn (e.g., performance criteria and the systems design did not become firm until more than 2 years into contract performance).
- As a result of the above, a need to constantly reschedule.
- Purchaser furnished equipment that operated below the level originally specified by the manufacturer.
- The inadequacy of site data available to the competing consortia during the bidding phase.

- The inadequacy of customer response to civil engineering and construction requirements (e.g., demanding and obtaining extra-scope work without compensation).

Two, as brough out in the Hochmuth study of the NATO Hawk project in his book Organizing the Transnational, the impact of management style of the director of the intergovernmental project office can be much greater in transnational projects than is typical of the more highly structured national defense procurement environment. Such was also the case with General Accart and the NADGE project.

Three, if an inter-firm company is properly set up, the contractor can enjoy the best of both worlds. This was the case with NADGECO. On the one hand a multinational image was maintained. One with which each participating nation, government and industry could identify. This can be of substantial significance with regards to customer and public relations, as borne out by the reaching of the settlement. On the other hand, though there were problems with the customer during the first 2 years with regards to project definition, being locked into a tight schedule and budget, the contractor was able to provide coherent management and operate effectively as if it had been one firm serving as prime. This was accomplished through formation of an integrated staff, utilization of the proper criteria in the selection of personnel, dedication on the part of management and technical personnel, plus a recognition by its five European partners that Hughes had substantially greater experience as a system contractor.

8. The Basis for NADGECO's Request for Equitable Settlement: Lessons Learned - Part 2

The following five points are those upon which NADGECO based its Request for Equitable Settlement, the history of which was covered above. NADGECO's description of its experience is presented here, in a condensed manner (be it obviously a negotiating stance and not a non-partisan description) because of the richness of its content vis-a-vis, the problems that can arise in transnational ventures.

a. Point #1

For the procurement of the NADGE system, the bidders' proposed technical solutions, having been dialogued by NATO, served as a substitute for the contract definition phase. The contractor assumed that its Firm Technical Proposal represented the definition of its obligation under the fixed price contract. However, once the bid had been accepted by NATO, customer priorities shifted from that of obtaining a minimal system at a minimal cost, to one of maximization of the system offered. This tendency, of course, is natural, except that in this case the shift from the bidding to the implementation phase of the program was also accompanied by a shift in the balance among the loci of authority from the one international agency to the nine host countries. Faced with national interests and their pressure for increased system performance, NADGECO was eventually forced to accept the increased requirements so as to keep work moving.

The dialogues between the bidders and the customer, when the technical proposal was being formulated during the program's bidding phase, were, on the customer side, almost exclusively with NADGEMO. Once it became necessary for NADGEMO to

coordinate the approval of the System Design Report and other matters, with the Ministries of Defense, their view of what was required of the system, came into the forefront. Using the document approval process to re-interpret contractor obligations, the MOD's questioned the system design in detail and were often successful in having their needs and desires incorporated into the system without changes to the contract.

The system's design and performance criteria did not become firm until more than two years into the performance of the contract, thus forcing NADGECO to dissipate its management and technical capabilities. Its scheduling and technical plans were in an almost continual state of revision for the first four years of the program, having to adjust to the constantly changing needs of the system design documents and host nation desires. The problems in firming up the system design resulted in delays in the manufacturing of equipment, while other equipment was produced without assurance that the design was firm. Therefore, the contractor was faced with an unfirm work statement and an urgent delivery schedule, but an inflexible price.

b. Point #2

In order to meet the four year schedule required by NATO for the project, the contractor had to rely on parallel implementation. Given the assumption that the accepted proposal provided a firm technical baseline, this was a feasible approach. However, as it turned out, NADGECO was eventually forced to perform sequentially many of the tasks that it had originally planned to perform concurrently. This resulted in considerable disruption of planning and led to

additional NADGECO management and technical resources having to be devoted to the constant replanning of work.

The document approval process adopted by NATO contributed to these delays in approval of the system design. This involved a committee-type approval process, which in turn led to the increasing preeminence of national over NADGEMO control of the project, and was further complicated by the late receipt of host nation data. Other problem areas that also played their part in disrupting parallel implementation were: those encountered in obtaining approval of supposedly "off-the-shelf" equipment; as well as the modification status or performance condition of purchaser furnished equipment generally not being known to NATO, NADGECO, or the host nations prior to contract award.

c. Point #3

The funding nations having fixed a ceiling on program funding, it was decided that the contract was not only to be fixed price, but also should not include a provision for price escalation, except as included in the original contract price. Thus NADGECO based its estimates of escalation on the recent historical record, estimating it at approximately 3.5% a year over the program schedule. In actuality, price escalation was approximately 8.5 over the program's implementation period.

Previous NATO Infrastructure Program projects were carried out (with few exceptions) through national contracts, where treatment of escalation followed each nation's established practices. Since it is generally accepted as unreasonable

to hold the contractor responsible in a multi-year fixed price contract for a cost over which he has no control, the practice of NATO's European members has been, predominately, to solicit fixed price bids at current rates, while providing a clause to pay for escalation through a formula or by some other means.

d. Point #4

NADGECO's original assumption was that its principal customer interface during contract performance would be a central NATO management authority; one capable of resolving technical and other problems within a reasonable period of time, and generally performing as if it were the sole customer. The following are the five factors that led NADGECO to this assumption.

(1) The approach of having NADGECO contract with the national governments on whose territory the NADGE installations were located, was viewed by NADGECO as merely an administrative convenience. Historically this has been the primary approach, among the several NATO has adopted, for working around the fact that NATO itself does not usually enter directly into major procurements on its own behalf.

(2) From the beginning, the bidding consortia had been concerned with the relationship between themselves, and NADGEMO and the host countries, being most anxious to avoid any possibility of having to deal with a decentralized multi-customer. Nevertheless, since the problem was also recognized by

NATO, with this being evidenced in both the proposed contracts and NPLO Charter—that NADGEMO was designated to manage the contracts—NADGECO considered the need for a centralized management authority as satisfied.

(3) Since NATO decision making depends on unanimity being reached, the achievement of which in turn depends on a necessarily time consuming process of trading off between intense national interests, program management would have to be vested in a central authority with control over the nine host countries. The assumption by the contractor of the necessity of a centralized NATO management authority, was not purely based on the logic of the need, but also on the long history of strong central organization during the bidding phase, by the language of the contract, as well as NATO's assignment to the contractor of near total responsibility for implementation of the already agreed to design and program plan.

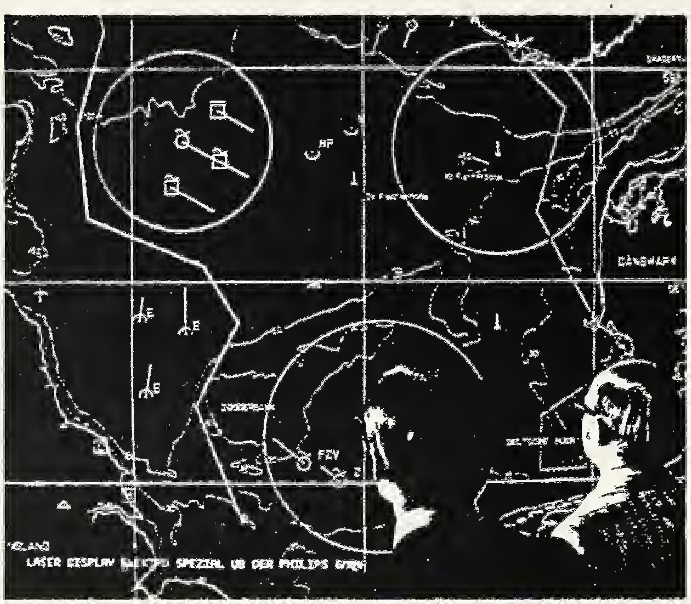
(4) Throughout the bidding phase, NADGEMO managed the procurement as though NATO were the sole customer, giving the bidding consortia assurance that NADGEMO was fully authorized by the host nations to reach technical and contractual agreements on their behalf, besides generally acting with authority, reaching decisions expeditiously, and showing a concern for a balanced trade-off between financial requirements and schedules.

(5) No contractor could have possibly offered a competitive fixed price bid for the system without a clear indication that program implementation would be under the control of one central management authority. This assumption was built into the contract in the following manner. Had the contractor been

expected to deal independently with each host nation, rather than with a central management authority, the bid price would naturally include an allowance for the extra effort required. Fully aware of this problem and its implications for obtaining bids below the program's ceiling, NATO's response to the competing consortia's questions was such that they felt adequately assured, and thus excluded provisions in their bid prices for any resultant delays and costs. In treating the authority vested in the NADGE Organization, subparagraph (i) of Article 20 of its Charter stated "general supervision of the implementation of the programme thus approved." The contracts also stated NADGEMO's task as one of coordinating the host countries activities so as to ensure conformity with the overall planning and implementation of the program. Article VII of the contract stated that the host countries delegated to NADGEMO, acting as their agent, design decision making authority, and allowed the contractor to rely on the validity of NADGEMO actions (as being within the scope of its authority) without having to verify them.

However, during program implementation, NATO authority was compromised from the very first. After NADGEMO selected the contractor, the host countries technical agencies became directly involved. It was almost immediately apparent that each regarded the contract as if the system was being procured for itself. The team of national experts that had been assembled within NADGEMO for the evaluation of the technical proposals, after having reached agreement together with NATO and SHAPE personnel on the acceptability of the proposal, was disbanded. The lack of retention of this team for implementation resulted in a loss of their collective sense of responsibility. This, plus problems resulting from

Sector Command and Control members of the 603rd Tactical Control Squadron plot coordinates for a European command and control exercise from within the squadron's mobile control and reporting post.



personnel changes within several key positions within NADGEMO, can be contrasted with NADGECO's having retained for implementation, from the bidding phase, its system design team and key management personnel.

Although NADGEMO provided the chairman for the committees reviewing and dialoging the system design (consisting of representatives from the host nations, NADGEMO, SHAPE, and the SHAPE Technical Center), it did not have the authority to overrule the highly instructed national representatives.

The attainment of unanimity tended to result in a "highest common denominator" solution. Virtually the entire technical proposal which had previously been approved by NATO acting for the nations, had to be redialoged, thus draining off NADGECO resources and generally interfering with performance. NADGECO had originally expected that NADGEMO as a "strong central management authority" would be allowed to act as the agent for the host nations. And furthermore, except as expressly qualified in the contract, NADGECO expected to be able to discuss problems and reach agreement with NADGEMO alone. In any case, it soon became apparent enough that the originally planned international-national arrangement had broken down, and NADGEMO's authority was to be severely constrained by the host nations. Faced with this new situation, NADGECO realized that if the project was to proceed on a basis remotely resembling the original plan, reconciliation of the divergent views expressed on various points could only be accomplished with substantial NADGECO participation.

In August and September, 1966, shortly after the acceptance of NADGECO's proposal, several host nations expressed the view that the test section of the Firm

Technical Proposal was not adequate, NADGEMO agreed to their request that a group be formed to solve the matter. However, NADGEMO authority to resolve the issue not being recognized, the host nation specialists assembled to settle the issue of testing requirements themselves, and operating independently each wrote up reports on the problems. The contractor was expected to comply with all the tests that they collectively desired. The first meeting of the National NADGE Coordinators held in early February 1967, some five weeks after work on the project had officially begun, again showed that NADGEMO was relegated to a coordinating, rather than decision making role. As an outcome of this meeting, the contractor was informed that, the host nations now had the right to comment on, and approve or withhold approval of the System Design, thus effectively cancelling the central authority provided for in Article VIII of the NAD contracts. In many cases following NADGEMO's original approval (and acceptance of the fixed price bid) the contractor was forced to bargain with the host nations so as to obtain the necessary approval.

With this new situation of the previously approved NATO requirements being further modified by the national interests, centralized direction of the program became secondary to what was nationally "required" and that it was possible to get the contractor to submit to. NADGECO had previously depended on the maximum degree of system uniformity and minimum reanalysis of previously approved technical solutions. Host nation personnel were insensitive to NATO's precontractual concern for control of cost, schedule, and system uniformity. The resultant changing and divergent interests of the national and NATO organizations involved, greatly contributed to the program's cost increase. Faced with this extra reanalysis and the customer's tendency to renegotiate at almost every

opportunity, NADGECO was forced to adopt a policy of submission and acquiescence in the interest of keeping the program moving forward and mitigating the results of disagreements.

e. Point #5

The fifth assumption was that there would be rapid and adequate response to program needs on the part of both contracting parties. However, commitments contractually undertaken by the customer (speaking collectively, both NATO and host nations) were not met, due to a lack of preparedness to participate fully in program implementation when called upon to do so. Several of the inadequacies on the customer's end that resulted in increased costs to NADGECO involved: provision of site data; training and experience of host country and NATO personnel; state of purchaser furnished equipment; and customer response to civil engineering and construction requirements.

The difficulty of obtaining complete and reliable site data was seriously underestimated. Whereas NATO initially undertook to furnish site data to the consortia for bidding, NATO found that it was not readily available, or could or would not be provided by the host nations. NATO decided to shift responsibility to the bidders so late in the procurement, that bids had to be made on the basis of very limited data. Then, six months into implementation, after having received a considerable amount of uncoordinated site data from the host nations, NADGECO determined that the submitted data was inadequate for providing a data base for design work. It was determined that comprehensive surveys of all sites would be impracticable, as well. Therefore, limited surveys to acquire the

necessary details were conducted, with the analysis of their results being complete by the end of 1967. However, since the previously accepted Firm Technical Proposal was not considered acceptable by the host nations or NATO, this limited survey data ended up being almost useless. After a further effort to resolve these differences (with the customer using this opportunity to make more changes), NADGECO finally had enough data to adequately begin the site design, civil engineering, construction, and installation tasks in several of the nations. This was in May, 1968.

The scarcity of host country and NATO personnel with sufficient training and experience also resulted in schedule delays and increased cost to the contractor.

As for purchaser furnished equipment (PFE), NADGECO had originally assumed that it would operate at the level originally specified by the manufacturer, and therefore planned its PFE interface design accordingly. With the host nations attempting to avoid responsibility and costs for PFE status and repair, NADGECO had to determine the equipment status and, in numerous cases bring it up to standard.

In the area of civil engineering and construction, customer response was not in accordance with the intent of the contract, as originally spelled out to the bidders. This included among others; extra demands resulting from the disallowance by host nations of economical construction materials previously proposed by the contractor under NATO guidance; extra civil engineering work on facilities that were already adequate for implementation of the system; and the

construction of new facilities not originally included in the contract as being within the scope of contractor responsibilities.

9. Conclusion

In spite of the numerous constraints within which this program was forced to operate, the alliance was provided with an adequate system for a final cost of around IAU 113 million. Due to this program's unprecedented character, its history is especially rich in lessons learned for future allied collaborative programs. On May 27, 1977 the NADGE Organization (in liquidation since January 1, 1975) was dissolved, with its remaining responsibilities having been transferred to national authorities and other NATO agencies and committees (i.e., the NATO Maintenance and Supply Organization (NAMSO), and the NATO Air Defense Electronic Environment Committee (NADEEC) and the NATO Programming Center[147] at Glons, Belgium).

With the completion of its last site in August 1973, NADGE, as the backbone of NATO's European air defense system, is still only one step in an ever continuing process. The system needs to be continually improved and further supplemented. NADEEC serves as the framework within which national views and options on the future development of the system are coordinated so as to retain an optimum level of operational efficiency for the NADGE System. As a supplement to this existing system, the NATO Airborne Early Warning and Control (AEW&C) system and the ground-based Air Command and Control System (ACCS) are the next major stages in the continual upgrading of the Alliance's integrated early warning, command and control capabilities.

10. The Upgrading of NADGE--ACCS--and the Broader NATO Air Defense Picture

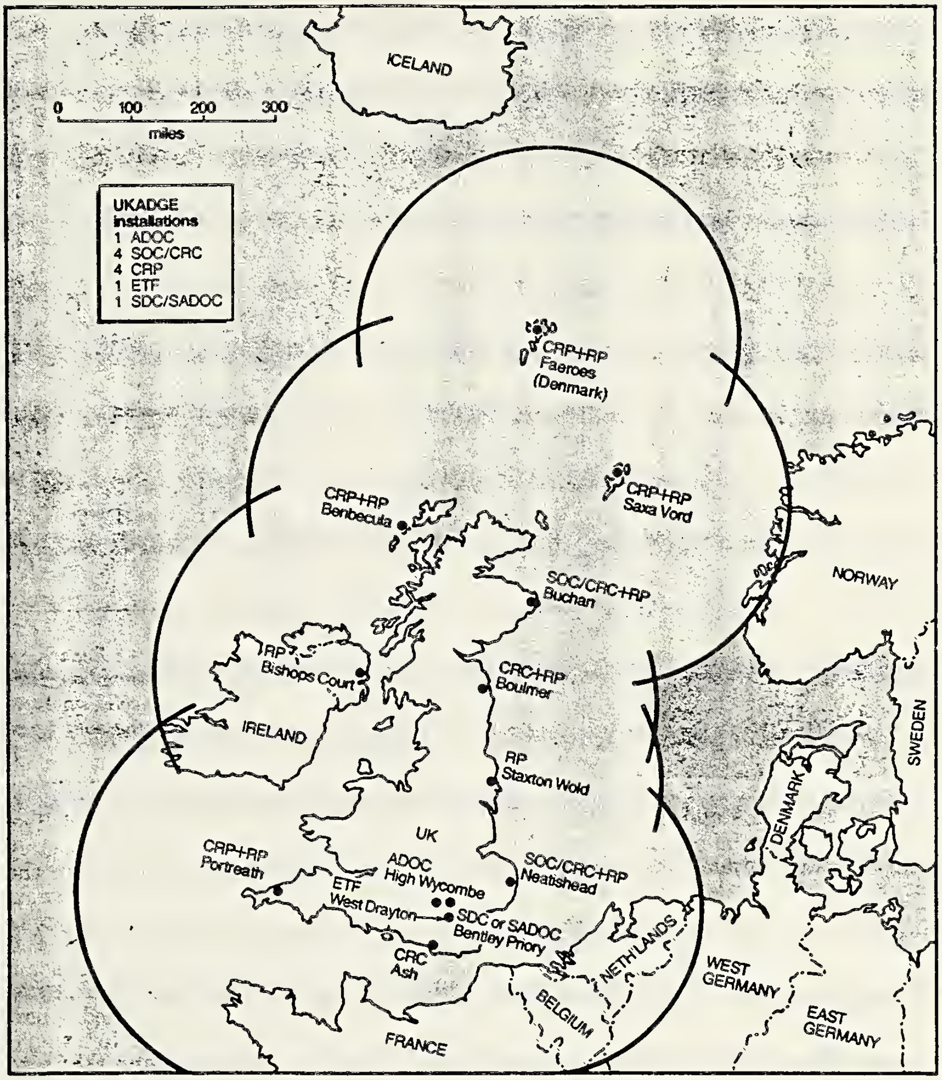
a. ACCS

NATO's Air Command and Control System (ACCS) Improvement Program was generated from the electronic portion of a NATO air defense study. The study was to serve as an architectural plan for NATO's future air defense system. It was put together by NATO Task Force #5, working one of ten component areas of the Long-Term Defense Plan (LTDP) drawn up in 1978. The ACCS portion is partially a follow-on to the NATO Air Defense Ground Environment (NADGE), but also includes as well a tactical element which will be funded by the individual nations. The NATO Infrastructure Program's share of the ACCS effort was estimated in 1979 to cost some IAU 400 million ($2 to $2.5 billion),[148] and will be implemented in progressive stages during the 1980's and the first half of the 90's and will serve as the ground base complement to the NATO Airborne Early Warning and Control (AEW&C) system. The first five years of this 15 year plan correspond to Slices XXXI-XXXV (1980-84) of the Infrastructure cost sharing program. It is expected that some IAU 130 million will be devoted to the up-grading of NADGE in Slices XXXI-XXXV, or in other words, the start of the NATO Infrastructure Program funded element of the ACCS.

(1) The UKADGE Competition

The long awaited updating of the UK Air Defense Ground Environment is being used as somewhat of a prototype for the replacement of similar radar and data

Building the big picture



*When complete, the improved UK air defence ground environment will give fighter controllers at regional command centres (***right***) a real-time picture of the UK air defence region (***top***)*

processing systems of the national components of NADGE. Overall cost of the UKADGE/NATO effort, is placed at around $300 million. After failure of initial UK efforts on the previous UKADGE system, this time around it was decided that funding would be through NATO Infrastructure Program. As such UKADGE is open to international competitive bidding for the first time.[149]

Since France participates in NADGE, the UKADGE competition will include French firms as well. France has recently announced that it is henceforth participating only in the air defense category of the NATO Infrastructure Program, which comes to about 10% the total Infrastructure Program for the next five slices.

The British program is divided into three stages; the first involving 2 fixed radar sites, the second with 5 fixed radar sites and the final stage in the equipment program will involve the acquisition of perhaps 6-8 transportable radars.

Actually only the first two stages are funded by the NATO Infrastructure Program—the third involves national funds only, and as such it is the UK government's prerogative whether there will be international competitive bidding or not.

The radars and the automation of the UKADGE are being handled through separate contracts. The RFP's were issued in December, 1978, for the two radars, and the UK's MoD announced the award of the UKADGE radar contract to G.E. (US) on behalf of NATO in June, 1980. All three stages should be completed by 1985. Virtually every radar manufacturer in the NATO member nations was competing for this contract.

For data handling aspects of the UKADGE program, maintaining competition has been more problematic. In April 1979, one of the two key British firms in the field, Marconi, joined up with its former partner Hughes, and formed a rather formidable consortium, one which included the other major British company, Plessey as well. The consortium, named UKADGE Systems Ltd. (UKSL) was to submit proposals requested by the UK's MoD on behalf of NATO to provide data display and processors for improving ground-based air defense equipment, which would be needed for the new radar networks.[150]

Though the consortium represented an ideal team, it didn't exactly serve the interests of competition. Other potential competitors were intimidated. At the time it was hoped that several other companies such as TRW, IBM, Philips, SINTRA, Thomson-CSF and Westinghouse would offer some competition. NATO took the position that a contractor should be able to justify such a large bidding expense. This was on the grounds that the experience gained would be crucial vis-a-vis the winning of future contracts for the updating of the NADGE component systems on the European continent (as part of the total NATO ACCS effort). However, no other bidders responded.[151]

The NATO Infrastructure Payments and Progress Committee (P&P Committee) took an active role in rectifying this anti-competitive situation. On the one hand, the Hughes led consortium's formation wasn't particularly attractive from the U.S. point of view, in that it eliminated price competition and it left two-thirds of the work in the UK, with the high prices and the low reliability on delivery dates that this usually involves. On the other hand, the European nations weren't happy either, the French especially, since this meant that their industry stood

little chance of getting a piece of the action for this vital contract (and that much less of a chance on later NADGE contracts). The French decided to initiate dispute proceedings under NATO's International Competitive Bidding rules. Once again a NATO Infrastructure contract brought to the surface the two opposing concerns regarding contractor selection, the U.S. pushing the need for competition and the Europeans insisting on their 'juste retour'.[152]

The P&P Committee, therefore, proceeded to examine other possible ways by which NATO could be assured of decent prices. One of these included the option of naming Hughes as the system contractor, while requiring them to seek international competitive bids on each of the pieces of equipment (as with ITT in 1958 for the ACE-High project). This option, however, was dropped, and eventually a compromise was reached to reopen the bid and to solicit other bidders. In November 1979, Westinghouse announced that it had agreed to form a consortium which included three European firms, to compete with the Hughes led team, under an extended time frame for the bid.[153] The other three members of the Westinghouse consortium were: International Computers Ltd. (ICL), of the UK; SINTRA, of France; and Hollandse Signaalapparaten B.V., of the Netherlands.

Meanwhile Hughes was acting to further diffuse opposition from France. This was done simply by taking on Thomson-CSF as the major subcontractor to UKADGE Systems Ltd. in January, 1980.[154] Now one half of the earlier NADGECO team had been reconstituted. The winner of the UKADGE/NATO Infrastructure Program competition was announced in late August, 1980. As expected the Hughes-Marconi-Plessey-Thomson team had won. The work is broken down as follows:

Hughes - The central data processing system and associated software, plus the large screen display system;

Marconi - The systems display consoles and voice communications;

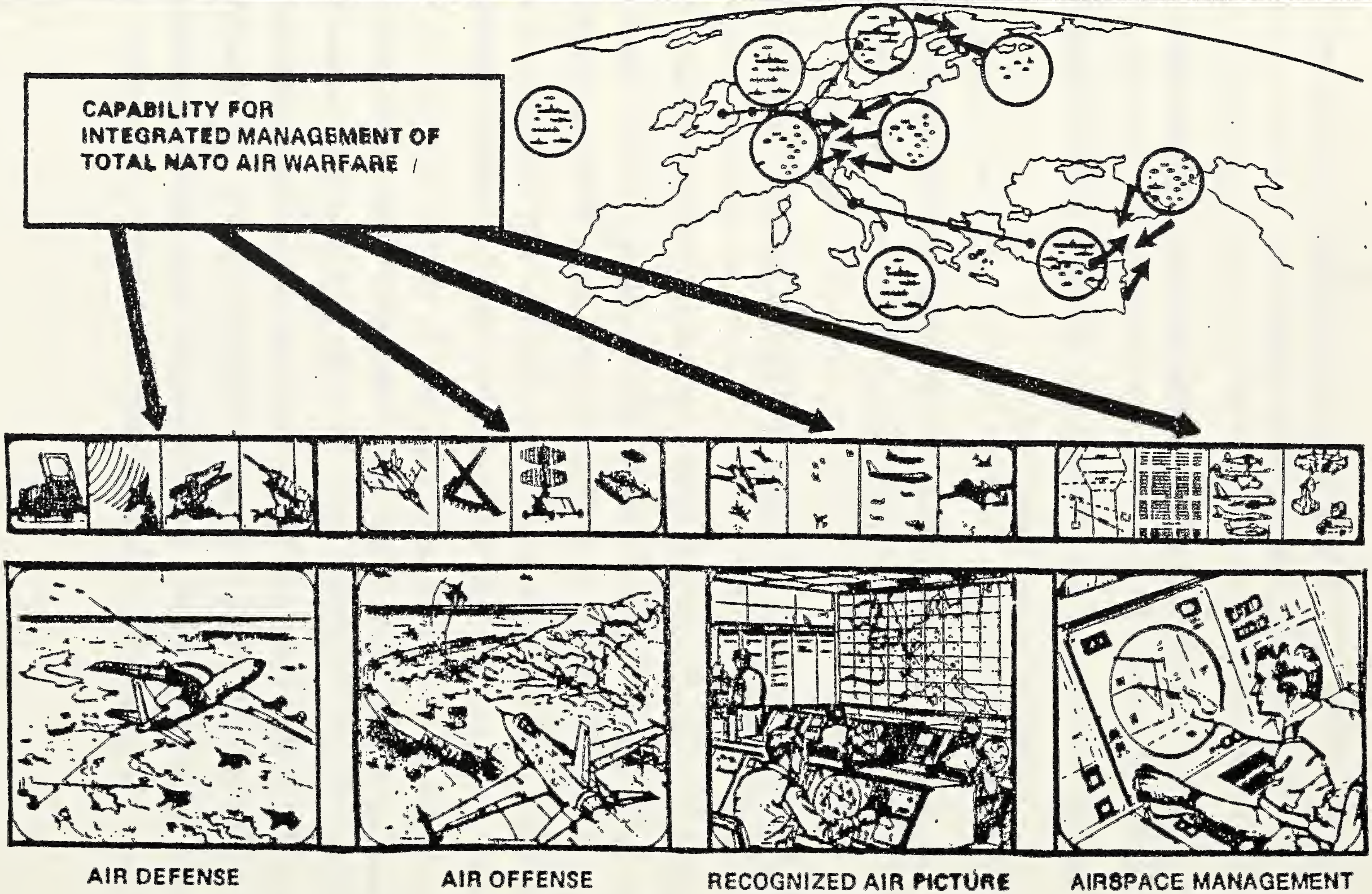
Plessey - Digital data communications plus the four-color indicator for the display console, and;

Thomason-CSF - Some components (under subcontract) and engineering expertise on the overall system.

(2) SHAPE's Plan for Future Air Defense and the ACCS System Definition Study

In pursuing its coordination responsibilities SHAPE's Air Defense Planning Group (ADPG) tasked the SHAPE Technical Center (STC) to draw up a Plan for Future Air Defense. Completed in March 1979, the ADPG requested the NATO Industrial Advisory Group (NIAG) to form an Ad Hoc Group on Air Defense to provide industry review, commentary, and guidance on the STC's plan. The study was nonfunded, costing the participating firms an estimated $750,000. The NIAG Ad Hoc Group on Air Defense completed its review in the fall. With SACEUR's ADPG having obtained the Defense Planning Committee's (DPC, i.e., the Defense Ministers) approval of the plan in December 1979, NATO had obtained an architectural foundation for planning a balanced air defense system for the next 15 years. Sub-groupings of the NATO Conference of National Armament Directors (CNAD) and the nations are working on the specific ADPG recommendations.[155]

Air Command and Control System



The DPC also gave approval at its December, 1979 meeting for the NIAG Ad Hoc Group on Air Defense's recommendation, that a follow-on ACCS system definition study be performed. The follow-on study was to be funded by the NATO Infrastructure Program for a sum then estimated at $2.5 million. Some quarters expected the study to involve around 40 firms from both sides of the Atlantic, each contributing approximately 1 professional man year. The ACCS specification once developed, was to be made available by NATO to the member states' defense industries, on a broad basis. As the year 1980 progressed the project slipped, being bogged down at the stage of reconciling the divergent views of national firms and governments as to how to set up the effort, distribute responsibilities, and select participants.

Indicative of the increasing importance of the ACCS effort, at its December, 1980 meeting, the NAC approved the establishment of a new standing committee, the NATO Air Defense Committee (NADC). The NADC replaced the NADEEC and assumed a broader scope of responsibilities which was to include coordination and planning for the full range of allied air defense efforts, i.e. including interceptors and SAM systems. The national components of the NATO Air Defense efforts through 1995 are estimated at $40 billion, with the common NATO Infrastructure program elements then estimated at another $4 to $5 billion.

In July 1981 the NATO Military Committee approved in principle the ACCS Military Operating Requirement (MOR). The MOR was revised by SHAPE shortly thereafter to an ACCS planning document, as it was assessed to need further work prior to coming up with a firm requirement. In particular, the need for industry support for the architecture/feasibility studies was recognized.

(3) Several National ACCS Projects

In addition to UKADGE, Hughes has continued to maintain its dominant position in the air defense field elsewhere in NATO Europe. Hughes Aircraft was selected in May, 1979, by the FRG to manage the design and installation of a computerized air defense system in the southern part of the country. The German ADGE contract is valued at $150 million and will involve the replacement of data processing and displays for the 412L radar network.[156] Hughes will provide computers and display consoles but plans to include German and other European industry as well. The German ADGE contract is also funded through the NATO Infrastructure Program. Though it will ultimately be part of the ACCS, its planning antedates the ACCS plan.[157]

Additionally, the previous August, Hughes had won a contract from the FRG for four radar air defense systems valued at $35 million which was the first major sale of a new generation of radars designed to meet new NATO specifications.[158]

Unlike the $150 million German ADGE contract this ACCS related contract is being paid for by the FRG, since the Germans had decided to follow their own rules and not wait for NATO funding.[159]

Another such national project is the U.S. procurement of the German developed EIFEL/DISTEL (E/D) as its automated command and control information system (CCIS) for the U.S. operated allied tactical operations center (ATOC) in Central Europe. The U.S. Air Forces Europe (USAFE) has been pursuing plans to implement this key element of the ACCS, by means of cooperative venture with the Luftwaffe

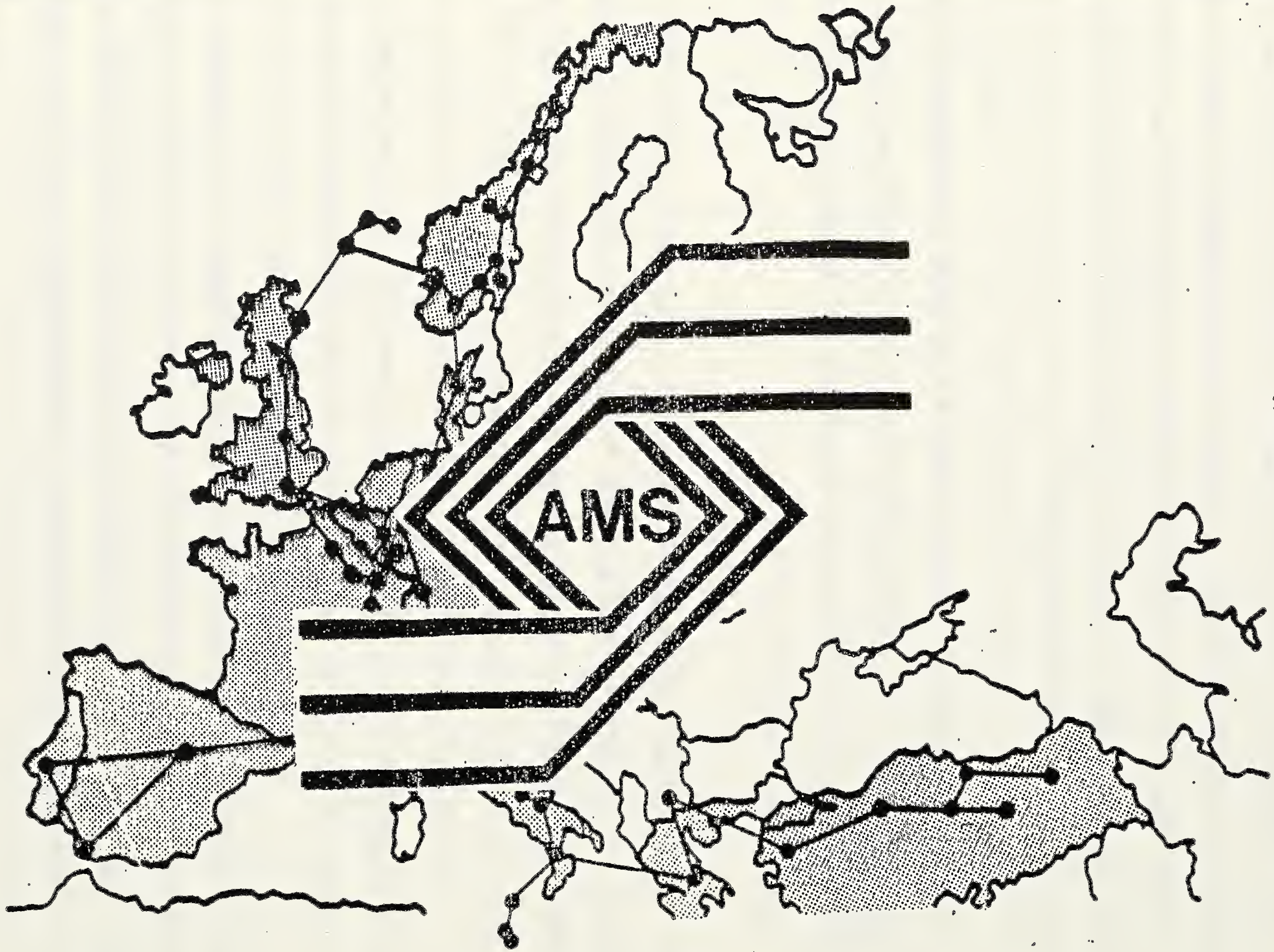
within the framework of the Central Region ACCS. The E/D system has been installed in the two NATO Central Region ATOC's operated by the FRG. A draft MOU is being developed by the U.S. and FRG for the adaption and procurement of the system for installation in the U.S.-operated Central Region ATOC at Sembach, FRG, in 1982. There will be terminals at USAF main operating bases and at collocated operating bases. A total of $25.5 million has been identified for EIFEL/DISTEL procurement from FY 81-86.[160]

This will mean that three of the four ATOC's in the NATO Central Region will have common equipment. Thus, not only will this procurement significantly enhance interoperability, but it may also provide the impetus for acquiring the same system for the fourth ATOC.[161]

"DISTEL" is the German air force's command and control system for tactical operations. It is based on a Telefunken TR86 computer. The system was designed for German tactical offensive air operations. As the system matures, an interface is envisioned with Honeywell 6000 equipment at higher NATO levels.[162]

Two basic programs are being implemented to improve the interface between land-based elements of NATO's air defense system and maritime elements operating in close proximity. Both of these will be funded through the NATO Infrastructure Program. The first is the development of a buffer system. The interface is referred to as the Ship-Shore-Ship Buffer (SSSB). SSSB procurement will begin in 1980. The U.S. Marine Corps buffer system called MANTA (Marine Command and Control System/NADGE Tactical Application Program) will be used as the SSSB.

Air Command and Control System



The second program will be directed toward rectifying deficiencies in procedures, plans, and operations to improve the land/maritime interface.[163]

(4) Three ACCS Study Contracts

In August, 1982, Boeing announced that it was teaming with a group of British, French, and German firms to form a new consortium to compete for future NATO ACCS work. Boeing had decided to expand from its base in the NATO airborne command and control field (AWACS) to the ground environment. The consortium is named Airspace Management Systems (AMS) and involved the allocation of 25% shares to the industry of each of the four nations, with participation as follows:

Country	Major Shareholder (17%)	Minor Shareholder (8%)
France	Aerosystemes-Alcatel	Informatique de Systemes et de Reseaux (ISR)
UK	Racal Electronics Ltd.	Logica Ltd.
FRG	Standard Electrik Lorenz (SEL)	Electronik System Gessellschaft (ESG)
U.S.	Boeing Aerospace Company	Westinghouse Electric Corp

The AMS Board of Directors is made up of one representative from each major shareholder. Note that the four firms representing U.S. and German industry were all involved in the NATO E-3 AWACS production program.

In 1983, Italtel joined AMS assuming a 15% share of AMS and bringing in a fifth national industry-that of Italy. The firms of the original four nations had their shares adjusted accordingly; for the major shareholders down to 15%, and the minor to 6.25%.

AMS

The answer to modern Air Command and Control

The Requirement

As we approach the 21st century, NATO must face a severe threat environment including the employment of sophisticated jamming, precision guided munition and tactical ballistic missiles. The NATO Air Command and Control System will have to be capable of establishing and disseminating in near real time an accurate picture of the operational air situation, provision of data to identify tracks and the means of rapidly transferring information to key control points in the system. Integrated airspace management and weapon system command and control will therefore be paramount.

The technological ingredients of an advanced Air Command and Control system incorporating these and other capabilities are identified and analysed by AMS. Such a system must significantly improve the management of defensive, offensive and support operations. For instance, the integration of surface and airborne active and passive sensors together with a reliable ECM-resistant communication network will be needed in order to supply the Commander with the appropriate decision data.

The AMS Approach

From its office in Brussels, located near to the NATO headquarters, AMS has developed a top-down, carefully structured methodology for the ACCS requirement.

AMS has consciously adopted this top-down approach to ensure that the best innovations in technology and integration are included to meet the demanding ACCS requirement. In parallel, AMS surveys existing capabilities and commitments seeking the most cost effective way of harmonizing the new with the old. The benefits of this totally open approach will be the introduction of the most advanced technical and affordable solutions available.

It sets clear performance goals yet enables ACCS to evolve affordably from present and planned facilities to effective solutions for the 1990's and beyond.

AMS
a total system capability

The Company has established international working groups [illegible] ACCS programme [illegible] Surveillance [illegible] Applications and Airspace Management. These activities also [illegible] computer modelling and [illegible] technology evolution [illegible] so that a system can be developed, refined and evaluated right through to the optimum answer. Development work includes advanced antenna techniques, millimeter wave radars, advanced signal processing and large scale information handling. AMS companies are among the leaders in the development of mobile and transportable sensors both passive and active, including long range surveillance radars with [illegible] integration, software production and system reliability. Concepts are to be presented to the NATO [illegible] technical [illegible] AMS involvement in the ACCS programme matures.

AMS Organisation

AMS is a [illegible] company structured from the combined resources of its shareholder companies, seven of which are European and North American, as well as several associated companies. The AMS Board of Directors make the company's high level executive decisions on the basis of one country, one vote.

AMS policy and the careful choice of member companies will ensure that the very best of modern technology, equipments and software will be made available to NATO for this important programme.

The long term commitment by AMS member companies will assist all NATO nations to receive fair returns, both military and industrial, on their related investments.

AMS Technology

The research and development work carried out by the member companies of AMS covers some of the most advanced engineering to be found in the Western World.

BOEING Structured design of very large scale directed software for aircraft tracking, intercept prediction, target identification and interceptor command and control has been researched and developed over many years. ECCM technologies have been evolved to counter heavy jamming and interference with sensors. EMP and Nuclear effects protection and effectiveness measurement techniques are extremely well developed and deployed.

ESG ESG is a hardware independent company which plans, develops and integrates complex electronic systems. Emphasis is given to advanced data processing technology applied to weapon systems for C3I, surveillance, combat command, navigation, attack and fire control. Cost effective solutions are provided over the entire life cycle using appropriate tools such as mathematical modelling, simulation and complete system analysis.

ISR ISR capabilities are directed toward real-time ADP system architecture definition of general purpose computers for military C3 systems. Its experience spreads over advanced initial studies and functional/operating procedure analysis to system design implementation. ISR deals with ADP configuration, interface definition, application software and operating system architecture.

ITALTEL The activities of Italtel and of the associated companies extend over the entire field of defence electronics such as EW, ESM/ECM passive systems and telecommunications including advanced technology switching systems and transmission systems for radio, cable and fibre optic applications. Products include IFF, UTDS, TDMA and [illegible] communication encryption systems. The companies employ the extensive use of in-house designed hybrid thick and thin film integrated circuits, SAW devices, Ga-AS and microwave components.

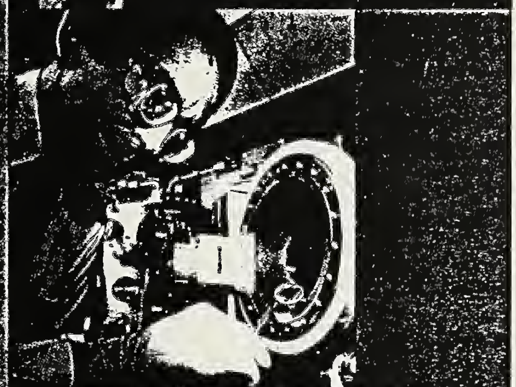
Logica work in the broad field of information technology with activities ranging from high policy and marketing consultancy to the volume production of electronic hardware. Major areas of activity include design and production of digital data networks – packet switched networks for ground applications, and image processing for military and space applications.

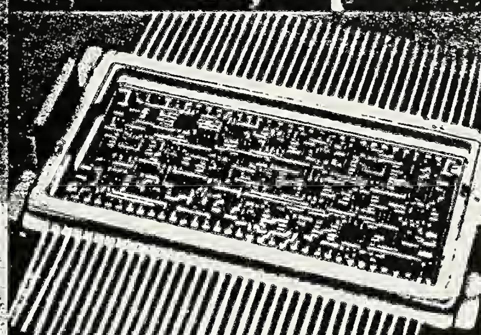
Racal is involved in new technologies directly applicable to ACCS concepts. Microelectronic development includes ULA's and SAW devices and thick film circuits for use in ECCM communications systems, identification systems, fast search and acquisition receivers for COMINT/ELINT applications, supported by real-time sensor processing software development and Expert Systems.

A major development area is sensor technology for example advanced radar systems up to millimeter waves, including the latest ECCM techniques, real-time signal processing, multi-static sensor configurations for air surveillance and passive sensors. In the field of communications emphasis is placed on ECM-resistant radio communications from VHF up to SHF, optical telecommunications and data processing systems.

Sintra-Alcatel's main field of activity is military data processing and display design and implementation. This has provided the Company with significant experience in signal processing, air defence command and control, extending to industrial processing and display applications. Other fields of activity are acoustic sensors and military communications.

Westinghouse leads in the development of VHSIC's which will have a profound cost and performance impact on new defence systems. Airborne and surface radars feature ultra low sidelobe antennas, programmable signal processors and raster scan displays. The technology of the ASPJ programme will continue to keep the company in the forefront of airborne electronic warfare systems.





Airspace Management Systems however, was only the second such consortium formed for the continental ACCS effort. The old NADGECO team had meanwhile reassembled, having formed another Belgian Corp., ACCSCO, including: Hughes; Telefunken; Siemens; Marconi; Plessey; Thomson-CSF; Hollandse Signaalapparten; and Selenia. New members included: Associated (Belgium); Siemens (FRG), Philips (Neth) and Plessey (UK).

In 1983 and 1984 NATO authorities (with the Belgian government serving as host country) issued RFP's for a series of three ACCS studies amounting to around $7 million in NATO Infrastructure Program funds which were to cover:

- o Sensors - including radar and passive sensors
- o Communication links
- o Automatic data processing facilities

The studies will provide the baseline data on the current command and control systems, along with the new equipment now available or likely to be by the early 90s.[164] A NATO team was to incorporate the data obtained from these study contracts into its ACCS master plan.

Members of the NATO team working on the ACCS project believe the ACCS update could encompass the following advantages:

- o Allow elimination of many restrictions that limit the ability of aircraft and missile systems to use all the capabilities built into them. An improved ACCS system, combined with new identification systems, would make it easier for fighter aircraft to use beyond-visual-range missiles, for example.[165]

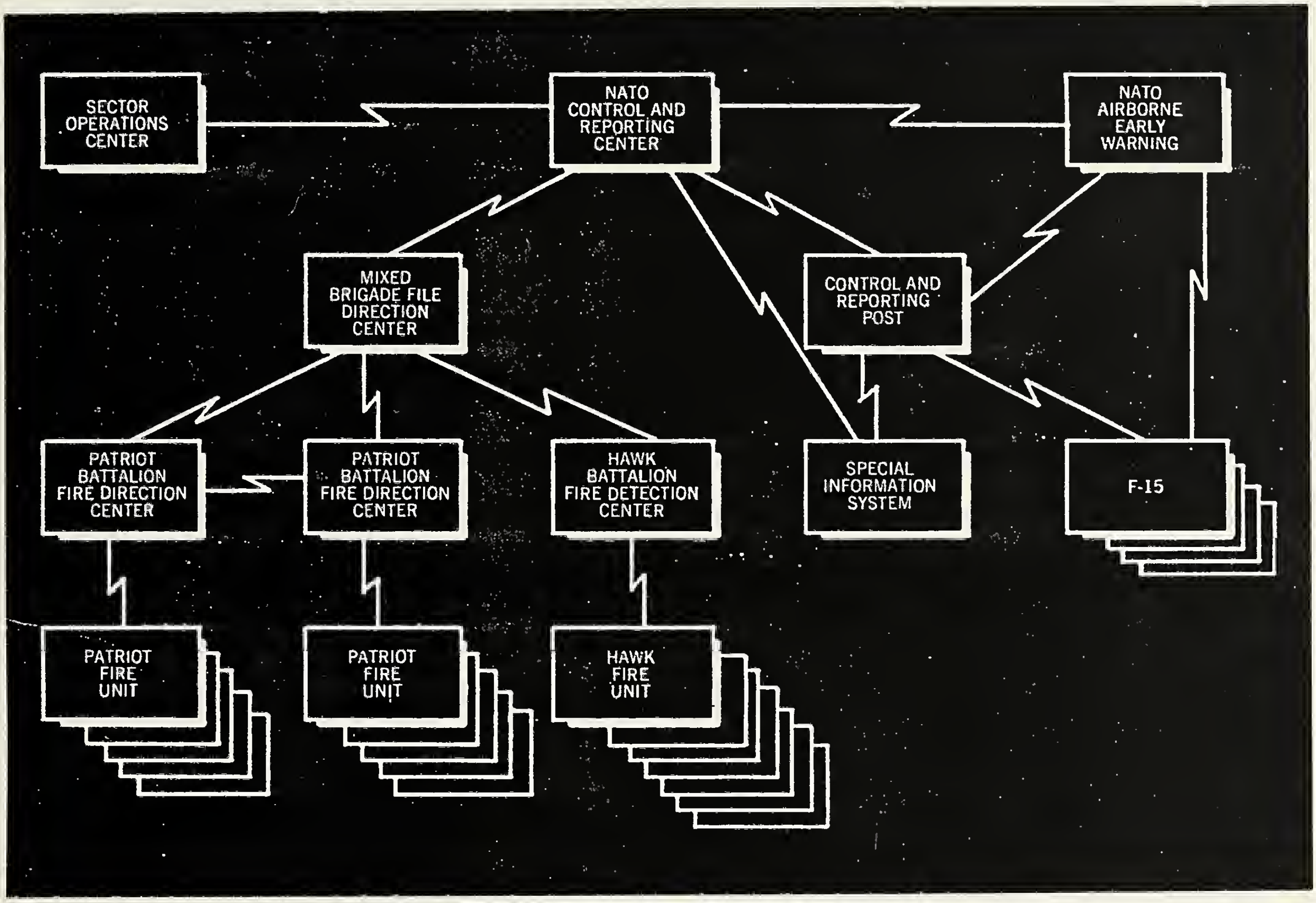


Figure Representative NATO Air Defense System.

- Provide one organization to task dual-role aircraft, instead of dividing the tasking between national governments and NATO.

- Make it less likely that NATO air defense forces would shoot down their own aircraft.

- Find gaps and weakness in the current air defense system and fill them.

- Avoid current system imbalances caused by the ability and willingness of some countries to provide better air defense systems than other NATO members, and caused by incorporation of technical improvements in some subsystems but not others.[166]

- Speed information processing, allowing quicker tasking of NATO aircraft, and therefore more sorties per aircraft.

- Improve commonality, be easier to maintain, and have a longer mean time between failures.[167]

ACCS was to provide a support structure that can either transmit controls and information from the NATO command structure or from the national commands.[168]

The most important change will be in investing enough money to bring the ACCS system to the same technological level as current aircraft and missle systems.

Two NATO officials quoted in Aviation Week in early 1983 put it this way,

> If we do not improve our present situation, the distance between the sophistication of the weapons and the systems that control them will make the weapons not worth the money we are spending on them.
>
> Speed is the main problem. That is what makes the present system unacceptable. We need to be able to task systems in minutes, not hours, because everything is so fast now, particularly missiles.[169]

The ACCS team also will study such factors as whether radars not specifically assigned to NATO can be brought into the NATO network, and whether current civilian air traffic control systems can be used to help control air space during war time.[170]

Estimates of the funding required to complete this upgrade were varying from 1 to 5 billion dollars at this juncture. In addition to the options as to the degree of technological sophistication that this wide variance reflects there is the usual question of how much of the acquisition will be centrally managed and how much handled by the individual nations. In the latter cases the NATO plan will still serve as a blueprint.

The contracts for the three one-year studies were awarded by the Belgian government between April and September 1984 in the following sequence:

- o The ACCS Multisensor Integrated Study (AMSIS)
- o The ACCS Database Implementation and Automated Support Tools Study (ADP Tools)
- o The ACCS Communications and Automated Data Processing Design Options Study (CADOS)

The AMS consortium won study contracts on all three, while ACCSCO landed contracts for the first and third studies. Reflecting the narrower national coverage of AMS member firms, a subcontract was awarded by it to SOBEMAP of Belgium for the second study, and one to CDC in the Netherlands for CADOS.

b. The NATO Indentification System (NIS) and other aspects of the NATO Air Defense Effort

As another important subset of NATO Air Defense (and one that falls outside of NATO Infrastructure Program) the allies are currently working on an effort that is expected to provide a NATO-wide architecture for the development of a future identification system that will overcome shortcomings of the present IFF systems which are of early 1960s design. This NATO activity, taking place under the

Conference of National Armament Directors (CNAD), envisions a NATO Identification System (NIS) with a secure, jam-resistant capability, with a means for processing and relaying identification data.

(1) The Problem

The Alliance presently uses two identification systems which are partially interoperable. The U.S. and several Allies have or are now obtaining the MARK XII system which is based on the civil air traffic modes, plus a crypto secure Mode 4. Other nations use the MARK X, which lacks a secure mode.

Unfortunately, these two systems tend to jam themselves in a crowded environment, such as would be the case with a central European conflict where massive numbers of aircraft would be deployed. To cite a recent example of the problems that this can lead to, in the first days of the 1973 Middle East war it is estimated that of the 158 aircraft shot down by Egyptian forces 89 were Israeli aircraft and 69 were Egyptian.

A major program to develop and field a new identification system within NATO seems likely to go ahead this year and involve an investment in the region of $250 million in the next five years and several billion dollars by the end of the century. It will replace the current IFF equipment, which itself represents an investment of some $2 billion and which, to quote any one of several military experts, "doesn't work". It will also provide for the identification of armoured vehicles on the battlefield.[164]

What has been needed is a new approach to the question of identification, major aims of which are to provide a dramatic increase in security and resistance to jamming, while reducing the size of the interrogation. As a result of the convergence of two lines of activity this is now happening: a positive decision by the NATO members that a new system was required, and; work carried out unilaterally in the FRG.

The NATO effort started in 1975 with the formation of a task force to consider the possible options for a new NIS with a question and answer (Q&A) component. The Q&A element is a priority development which could be ready for introduction in the late 1980's. By January 1979 work had progressed sufficiently for a draft

NATO Standardization Agreement (STANAG) to be considered. NATO's Conference of National Armament Directors (CNAD) had its Tri-Service Group on Communications and Electronic Equipment (TSGCEE) set up Project Group 2 for NIS, to look into a way the transition could be made from the current system, to a future one.[165]

Those countries participating in TSGCEE Project Group 2 include Belgium, Denmark, France, the FRG, Italy, the Netherlands, the UK and the U.S. TSGCEE Project Group 2 is organized in two working groups to deal with direct and indirect identification techniques and the overall system architecture. A key element in the indirect sub-system is a fully interoperable multifunctional data distribution system which would handle the IFF traffic load in addition to other needs. In both of these critical supporting areas, the participants have reached agreements on technical approaches, programs of work, and management techniques. The target date of December, 1979, for production of a draft was met. The draft has now been circulated to all NATO countries for their consideration and comments.

The target date for the refinement and confirmation of the Q&A STANAG is December, 1980. The TSGCEE Project Group 2 agreed to support a special project office in NATO and to harmonize major milestones and foster industrial cooperation in the interest of achieving the earliest possible date for transition to the NIS. Until the NIS is available the US will continue to press for wide use in NATO of the present US MARK XII System, or interoperable variants of it that result from national product improvement initiatives.[166]

(2) The German Effort

The current draft STANAG is based largely on work done in the FRG, since 1973, on a system known as CAPRIS. The work was started in the FRG as an effort to devise a Battlefield IFF(BIFF) system which could enable tanks and armoured vehicles to be identified in a crowded battlefield, both by ground forces and by aircraft. This was seen as the major requirement in the FRG, although it was also planned that the system would be able to carry out air-to-air and other forms of identification as well. The CAPRIS system has been under development by Siemens, under a series of study contracts from the German MoD. As of early 1980 Siemens was still working on a study contract basis, there being no formal operational contract for CAPRIS.

However, the most important thing about CAPRIS is that it has shown that a different identification system is possible, and has demonstrated, apparently successfully, that this function can be combined with primary sensors and can operate in the battlefield environment without producing its own, self-jamming interference. It has also produced a number of new ideas for air defense identification in the ground-to-air and air-to-air modes.[167]

(3) NIS as of Early 1980

The U.S., with the most advanced IFF system in the world—its MARK XII—has done little work on any newer systems. It can be argued, however, that an improvement program -especially considering the very large U.S. investment in MARK XII -could achieve even more by evolution and thereby avoid the tremendous problems

and cost which would result from the revolution involved in introducing a completely new system. The problem however, is that the system was developed in the 1960s, and that there are whole new branches of technology now available which could provide a much more effective solution for the late 1980s and 1990s.[168]

In any event the U.S. is continuing to participate in the formulation of a NIS, a system which could involve U.S. procurement of a major European developed system either through direct purchase or production under license in the U.S.

The UK, for one, fully supports the STANAG, be it one based largely on German work. It has indicated it will not adopt the U.S. crypto secure Mode 4, because it expects the new NIS to be ready in several years. A formal co-operative agreement is understood to exist between Siemens and the UK's Cossor Electronics Ltd., which is thought to be working along similar lines.

It seems to be clear that the NATO Identification System (NIS) is taking form. It remains to be seen however, whether the lengthy and acrimonious struggle over recent Microwave Landing System (MLS) competition can be avoided. The previous failure of NATO Basic Military Requirements no. 3 and no. 4 in 1962, for V/STOL fighter and transport aircraft respectively, also comes to mind. With the December, 1980 target date for a finalized STANAG, not much time is left for the formation of international teams, or competitive proposals and evaluations. Until the NIS is available the U.S. is continuing to press for wide use in NATO of the present U.S. MARK XII System, or interoperable variants of it, the result of national product improvement initiatives.

(4) <u>The Recent Activities of the TSGCEE's Other Two Project Groups Concerning NAVSTAR GPS and MIDS</u>.

TSGCEE Project Group 1, Project Group on Further NATO Cooperation in NAVSTAR GPS was held in Los Angeles, California on 18-19 September 1979. The meeting was held in conjunction with the semi-annual meetilng of the NATO NAVSTAR GPS Project Steering Committee at the Headquarters of the USAF's Space and Missile Systems Organization (SAMSO). The steering committee directed that studies be conducted to determine standardization alternatives and also established a standardization working group to draft a standardization agreement. The future introduction of NAVSTAR into NATO's military forces will have a significant impact on military operations and interoperability, e.g., all units will be able to operate in a real time, allweather, common 3-dimensional grid system.[169]

The TSGCEE Project Group 3 is examining the contributions to multiple functions and missions of links it identifies as Multifunctional Information Distribution Systems (MIDS). MIDS includes those systems which have communications, navigation and identification (CNI) capabilities integrated into a common unit.

Primary systems are the JTIDS (US), SINTAC (France), and MACS (Germany), all of which use spread-spectrum multiple access techniques to share information among many discrete participants. In a year-long study of system architectural and mission applications that began in July 1979, a six-nation government/industry team studied these links to develop an outline of essential characteristics for a NATO-wide MIDS; this effort was complemented by a comprehensive concept of operations under development by SHAPE. It is envisioned that the NATO MIDS will

provide timely and secure CNI information flow under electromagnetic countermeasures conditions, and the potential for a common NATO development is being fully explored.[170]

(5) <u>NATO Air Defense: Other Projects</u>

Other aspects of the NATO Air Defense effort outside of the NATO Infrastructure Program are covered in following sub-chapters of this paper. These include: the procurement by NATO of an Airborne Early Warning and Control (AEW&C) system comprised of the 18 Boeing E-3A aircraft; dedicated all-weather interceptor aircraft (e.g. the MRCA Tornado); and the strengthening of the forward SAM defense belt (e.g. Improved Hawk, Hawk PIP, Patriot) and provision of additional surface-to-air capability to improve defenses in the field and at key ports and installations (e.g. Roland, and Rapier).

C. NAMFI

The missile range built on the island of Crete during the mid-60's called NAMFI (for NATO Missile Firing Installation) falls within the range of those sophisticated equipment projects whose construction was funded by NATO Infrastructure funds, but is exceptional in that it is outside of the C^3 and Early Warning fields. As mentioned in the previous chapter, its operation and maintenance costs are funded along normal lines by the ad hoc group of user nations.

Initially ten countries were interested in using the facility but Turkey, Denmark, Norway and Italy dropped out before construction was completed.

France left the organization as well, in 1970, after its firm holding the initial 3-year contract for the drone target system lost the follow-on contract to a U.S. company.[171] The five nations making up the user group as of 1979 are the U.S., the FRG, the Netherlands, Belgium and Greece. Greece naturally also serves as the host country.[172]

The project's construction involved three phases, the first two of which were funded by the NATO Infrastructure Program. Funding of the third phase, however, was prorated among the participants on the basis of use.

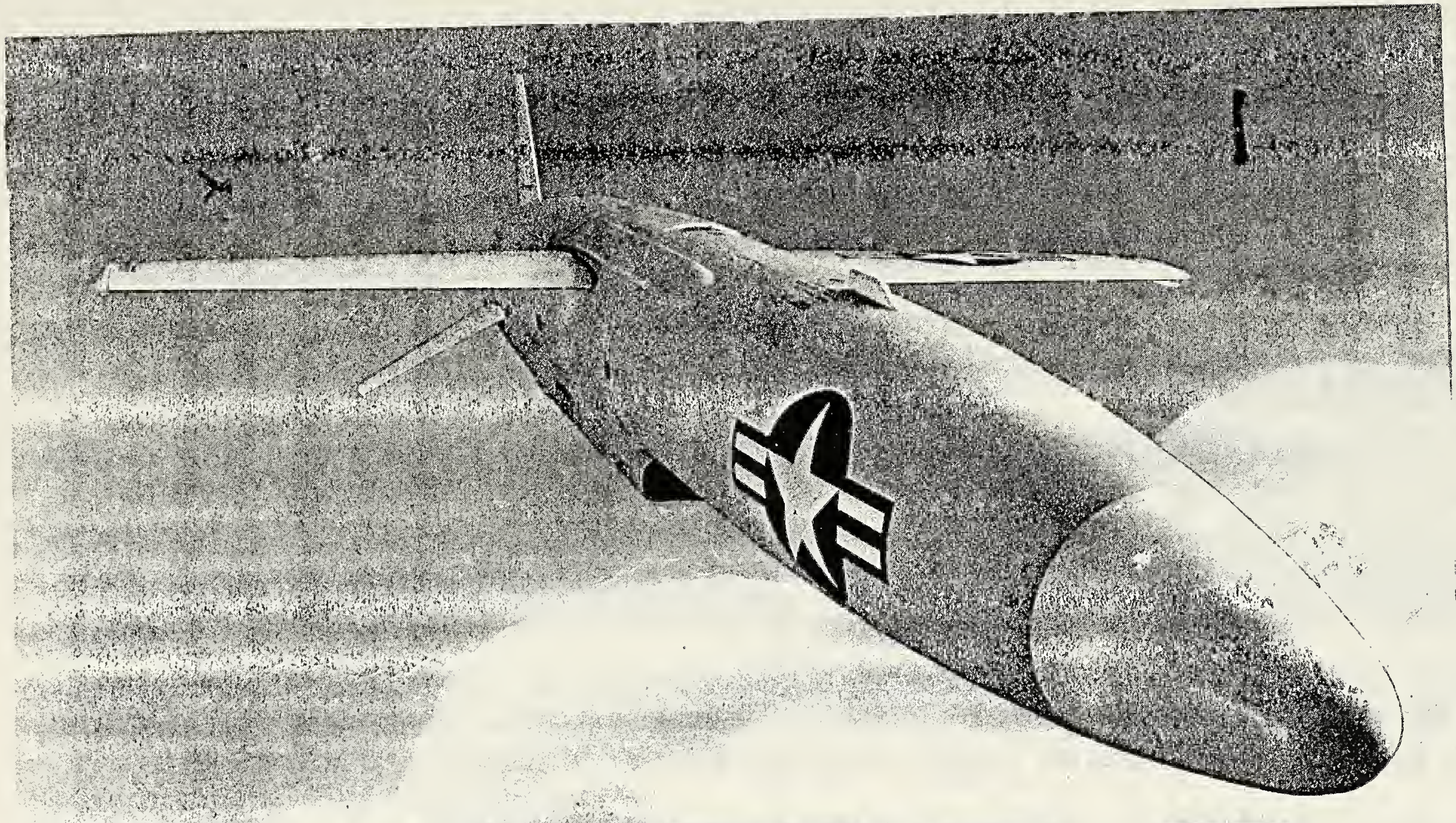
The first phase involved brick and mortar work. The second phase was for instrumentation of the range, and involved high performance radar and computer systems. From among those companies bidding for this contract, only three firms, all American, were 100% compliant with the specifications. The final award to

the winning American firm was delayed for over a year because of a bid protest by France and several other nations.[173]

The third phase involved a multi-year contract for the installation and operation of a drone target system, and stirred up an even bigger dispute. Since this phase didn't involve NATO Infrastructure funds, the major user, the U.S., who was paying some 35% to 40% of the continuing cost, expected one of the two competing U.S. firms to get the contract—to be awarded by the Greek Government, again acting as host country but this time for the ad hoc group of users not for the alliance-wide Infrastructure program.[174]

In October, 1964, Washington was shocked to find that the French Nord CT-20 was to be chosen—Nord Aviation being from a country that was programmed to use the range less than 5% of the time. The U.S. Secretary of State reacted immediately cabling the U.S. Ambassador in Greece that he was to insist on the selection of an American product (the North American Red Head/Roadrunner).[175]

Though the American complaint forced the Greek Government to reconsider, the problem was complicated by the fact that the Roadrunner was not just technically superior to the CT-20, but was also more expensive - $43 million compared to $38 million. As an example of a problem faced in many another NATO contract with regards to governmental agreement on specifications, though offering less performance the CT-20 also met SHAPE specifications for target missiles, only at $5 million less. This latter point was the decisive criterion for selection.



CHUKAR II

Over a year later in late 1965, the Greek government's selection of Nord was reaffirmed, the U.S. in the meantime having dropped the issue.[176] Following negotiations between representatives of the U.S. State Department and French Ministry of Foreign Affairs, the U.S. had conceded to the French negotiators.[177]

The range, originally scheduled for use in 1965, became operational in 1967. In 1970, with the contract up for renewal, Nord, which had proved to be very high in cost, was replaced by Northrop. Northrop has retained the contract ever since, receiving from the Greek MOD a $3.1 million extension in 1975,[178] a $5.7 million contract award in 1979 for its MQM-74C aerial targets and related services, and a $61.1 million multi-year contract in July, 1980 to cover the period July 1981 to December 1984.[179]

NAMFI is partially supported by the NATO Maintenance and Supply Agency (NAMSA) in handling its instrumentation equipment.

[1]For those other NATO efforts in C^3 I'll refer you to the 1980 DOD Report to the U.S. Congress on Rationalization/Standardization within NATO, pp. 21-34

[2]NATO Letter, April, 1957, p.3.

[3]"The NATO Communications Network, "International Defense Review, April 1972, P. 363.

[4]Kenneth F., Zitzman, "International Systems Problems as Exemplified by NATO Project ACE-High," Signal, Vol. 15, November, 1960, P. 44.

[5]ACE is the acronym for Allied Command Europe.

[6]Maj. Gen. Frank W., Moorman, (USA) "Communications and Electronics in Allied Command Europe," Part III, NATO's Fifteen Nations, December, 1960, p. 41.

[7]The SADTC was-later renamed the SHAPE Technical Center. The work of the SHAPE Technical Center has been of importance to these C3 and early warning functions gradually transferred to NATO over the last 3 decades. The center, formed in 1954 and originally called the SHAPE Air Defense Technical Center, had as its primary function the development of an improved aircraft control and warning system for Europe. The Air Defense part of its name was dropped as it continued to broaden its scope to a wider range of problems confronting NATO, including the conception and design of numerous improvements in NATO communication systems.

[3]Zitzman, op. cit., p. 45.

[9]Ibid.

[10]Ibid.

[11]Ibid.

[12]Ibid., p. 45.

[13]Zitzman cited one example of a major frequency problem, "the solution of which seemed almost impossible. A mobile microwave system was being installed between a NATO military headquarters in France and two subordinate NATO headquarters in Germany but no common frequency band for use between the two countries could be agreed upon. They actually considered demodulating the signals near the international boundary, crossing the border by a wire circuit, and then return to the radio system. A temporary solution was found but even now, almost four years after the frequency problem was first raised, a permanent solution has not been finally agreed to." (Zitzman op. cit., p. 47.)

[14]Quoting Zitzman: Language differences must be recognized as problems and measures taken to solve them. To meet our insurance requirements in Turkey for example, we must translate all documents into the Turkish language. This sounds simple but there are so many technical terms that do not lend themselves to translation that it is, in fact, extremely difficult. As an example, consider the Armed Forces Signal School at Izmir. They originally intended to conduct all the instruction in Turkish but when they saw the problems involved in translating the texts, they decided instead to teach all the students English first, and prepare the course material and conduct the instruction in English.

As part of our contract, ISEI conducts a school to train NATO military personnel in Maintenance and Operation in order to provide the necessary technicians to operate the system after it is completed. We have about 60 students there at a time; the instruction is conducted in English and certain

national groups have had to provide their own interpreters. The instruction proceeds somewhat more slowly than it would otherwise, of course, but it is effective. (Zitzman, op. cit., p. 47).

[15]Ibid., pp. 45-7.

[16]Ibid., p. 48.

[17]Signal, January, 1964.

[18]"The NATO Communications Network," International Defense Review, April, 1972, p. 364.

[19] Harold Brown, Secretary of Defense, Rationalization/standardization within NATO, Fourth Report to the U.S. Congress, January, 1978 pp. 57-8.

[20]Ibid.

[21]Ibid., pp. 364-5.

[22]J.H.R. Willigen, "An Organizational View of NATO's Needs for Communications," Signal, February, 1977, p. 16.

[23]Ibid.

[24]One additional project which is to be integrated into the NICS network is the Central Improvement Program (CIP-67). CIP-67 has involved Siemens, as contractor to SHAPE, providing microwave line of sight capabilities for the large numbers of subscribers in the Central Region where the transmission facilities are replacing existing networds serving NATO Headquarters in the area. The plan has been to interconnect CIP-67 microwave transmission

facilities with existing US facilities at selected collacated sites and perhaps to overbuild the system for US requirements.

NICSMA has since identified a number of other potential interconnection projects and established liaison with the US and other NATO nations. A working group, established liaison with the US and other NATO nations. The working group, established in November 1976, proposed technical solutions to interconnections where they can be achieved to the mutual benefit of the systems and parties involved.

[25] C-M(71)19 translates to 'Council Memorandum number 19 for the year 1971'.

[26] Lt. Gen. Herbert Buchs, Luftwaffe (retired), Director of NICSMA, "NICSMA: A New Concept in NATO Management," Signal, February, 1977, p. 24.

[27] Interview with T.J. Loveland, Director Infrastructure and Logistics Division, U.S. Mission to NATO. June, 1978.

[28] Lt. Gen. Harold A. Kissinger, USA, "Organization for Crisis Management in NATO," Signal, March, 1975, p. 70.

[29] The only other specifically operational authority set up within NATO (as an NPLO) for a system constructed through the Infrastructure common-funding program is the NATO pipeline system's CEOA, covered in Chapter 4.

[30] The U.S. has almost always refused to make its crypto equipment available to NATO for security reasons.

[31] Loveland, op. cit.

[32] Buchs, op. cit., p.24.

[33]"Litton Gets Additional Funding for NATO NICS/TARE Systems," Aerospace Daily, February 16, 1978, p. 253.

[34]Harold Brown, Secretary of Defense, Rationalization/Standardization within NATO, Sixth Report to the U.S. Congress, January, 1980, p. 26.

[35]Buchs, op. cit., p. 24.

[36]"Electronics--NICS" DMS Market Intelligence Report, DMS Inc., October, 1979, p.2.

[37]Ibid.

[38]DOD, op. cit., p. 25.

[39]DOD., p. 22.

[40]DMS, op. cit., p. 3.

[41]Ibid., p.2.

[42]Ibid., p. 3.

[43]Brown, 1978, op. cit, p. 50

[44]Col. Dwane R. Valentine, USAF, "NATO's Communication Satellite System," NATO's Fifteen Nations, Oct.-Nov, 1970, p. 62.

[45]Lt. Col. Helge Omreng, Norwegian Army, "SHAPE Steps into Space Communications," NATO's Fifteen Nations, April-May 1968, p. 59

[46]The Allied Forces South Headquarters

[47]Omreng, op. cit., p. 59

[48]Valentine, op. cit., p. 64

[49]Ibid.

[50]UK firms did produce some components for its own satellites.

[51]Anne Sington, "NATO SATCOM," NATO Letter, March, 1968, p. 20.

[52]This agency relationship was similar to one later set up between NAPMA and the Air Force's ESD for the acquisition of the NATO Sentry (AWACS) system.

[53]Ibid.

[54]Ibid., p. 66.

[55]Ibid., p. 68.

[56]Sington, op. cit., p. 20.

[57]Loveland, op. cit.

[58]Arbitration in re NATO SATCOM Phase III Project, Standard Elektrik Lorenz AG (Claimant), against SHAPE (Defendent) and NICSMA, Statement of Claims by SEL, p. I-2.

[59]Valentine, op. cit., p. 68.

[60]Ibid., p. I-3.

[61]Ibid..

[62]Ibid.

[63]Ibid., p. I-4.

[64]Ibid.

[65]Ibid., p. I-5.

[66]Ibid., p. I-5.

[67]Ibid. p. I-10.

[68]The full title being "Protocol on the Status of International Military Headquarters set up pursuant to the North Atlantic Treaty."

[69]Interview with the NATO Legal Advisor, Mr. Lejeune, June, 1978.

[70]Since the acronym 'NATO' refers to a multitude entities, it is useful to be a bit more specific. In this case NATO means the Infrastructure Payments and Progress Committee, through which the funding nations supervise the implementation side of the NATO Infrastructure Program (treated in detail in the previous chapter). This distinction is important, in that the Organization, NATO, is such a highly decentralized multi-headed beast.

[71]Loveland, Letter to the Author, October 17, 1979.

[72]In this case, 'NATO' refers to NICSMA.

[73]Loveland, op. cit.

[74]Ibid.

[75]The Air Force Space Division was set up in October, 1979 to manage the space programs that had previously been under SAMSO.

[76]Formerly Philco-Ford, who also had the contract for the NATO-2 satellites.

[77]In April, 1979, in accordance with contract terms, Ford started earning incentive payments of $2690 per day—up to $2 million—on its NATO III-A satellite, once it had been successfully in orbit for 3 years. Failure prior to this point would have cost Ford $2020 per day up to $2,211,000. Identical terms apply to

the NATO III-B satellite. The NATO III-C satellite, involved a new design, and therefore was not covered by similar terms. For NATO III-C only positive incentive payments are provided for, and these take effect only if NATO III-B fails to earn $737,000.

[78]"NATO Studying New Series of Satellites," Aviation Week and Space Technology, October 17, 1977, pp. 127-8.

[79]Brown, 1980, op. cit., p. 28.

[80]The five fixed terminals will be located in Iceland, Italy, Norway, Turkey, and the U.K. For the SGT in Iceland special arrangements were required. Since Iceland has no armed forces, it has been involved directly only in the political side of the Alliance. On the military side, the role is basically a passive one wherein the Icelandic government basically contracts with the U.S. government to provide for national defense, e.g. the USAF base at Keflavik. In addition, for the NATO Infrastructure Program the U.S. acts as host country for construction in Iceland. In 1978 negotiations were completed between the US and NATO for the US to man and operate the SGT to be installed in Iceland. In return, for this service the US will obtain a specified number of circuits through the NATO satellite system for US use. The MOU covering this agreement was signed at the April 1978 plenary meeting of the NATO Joint Communications - Electronic Committee (NJCEC).

[81]"NATO Ground Stations to be Upgraded," Aviation Week and Space Technology, June 26, 1978, p. 24.

[82]Ibid.

[83]This subject was covered in the previous chapter.

[84]Conversation with Joseph Miller of OASD/ISA.

[85]There has only been one case of a nation not accepting such a decision. It involved the FRG but this was eventually resolved at the DPC - Ambassadorial level - with the FRG finally submitting to the Board of Arbitration's decision.

[86]Aviation Week and Space Technology, October 17, 1977, op. cit., p. 127.

[87]Now that the ESA/CNES Ariane is in the picture as an alternative launcher, and one which breaks the previous U.S. monopoly in this area, it will be interesting to see if it will be used for the NATO-4 or later launches.

[88]Aviation Week and Space Technology, October 17, 1977, op. cit., p. 127.

[89]"Ford Sells Two More NATO III Communications Satellites," Aerospace Daily, January 7, 1981, p.20.

[90]Doing Business with NATO, Armed Forces Communications and Electronics Association (AFCEA), April 10, 1979, "Industry Perspectives of Problems and Solutions of Doing Business with NATO", Douglas G. Dwyre

[91]Ibid.

[92]Ibid.

[93]Ibid.

[94]Ibid.

[95]John Marriott, "NADGE: Radar Shield for NATO," Aerospace International, January-February, 1970, p. 14

[96]The U.S. government was apparently concerned that U.S. industry would not get back its 'juste retour' (this being a time of the U.S. crusade to counter gold-flow problems). U.S. industry, however, generally felt they would have received an even larger share if it wasn't for this provision. In any case, as we will shortly see, the knife cut both ways.

[97]Brig. Gen. Elliott Vandevanter, USAF (Ret.), "Common Funding in NATO," The Rand Corporation, June 1967, pp. 58-59.

[98]The normal question and answer portion of the Bidders' Briefing was handled by means of submission by industry of written questions followed by NATO's publication of these questions together with their responses.

[99]Litton originally headed this consortium but which later passed its position as lead company on to ITT, as ITT (with its member companies located in all NATO nations except the two smallest, Iceland and Luxembourg) was best suited for the role of systems manager.

[100]"National Networks Complicate NADGE," Aviation Week and Space Technology, June 14, 1965, p. 77.

[101]An explanation of this point was offered by John Marriott in an article entitled "The Air Defense of Europe," in the Oct-Nov. 1973 issue of NATO's 15 Nations, p 47. "Why Britain is so different is difficult to understand, but it probably stems from the fact that in the late 1950s Britain's air defenses were far superior to anything to be found in the rest of Europe, and she was already planning her own computerized reporting system."

[102]Reed, Letter to the author, March 9, 1978.

[103] NATO Unclassified Document, NADGE/D/3-5-01/215, "NADGE Management Office Final Report," November 14, 1975, p. 33, (hereafter referred to as NADGE/D/3-5-01/215).

[104] In response to the author's question as to whether the U.S. government carried more, or less, weight in the NADGE Organizations decision making process than its funding share would have warranted Robert S. Reed gave the following reply: "Although a difficult question to answer, it would appear that the United States Mission carried more weight in the decision making process than its funded share warranted, probably because they took a more active part in discussions, problem solving, etc. It is interesting to note that even the smallest of participating nations can in the NATO context of unanimity exercise as much weight as its largest colleague and in many instances this is precisely what occurred. In the overall sense however, it is our opinion that the United States Government exercised influence on the program somewhat in excess of its funding share, and it is not surprising this was the case, particularly in view of its leading technical position in air defense." (Letter to the author dated March 9, 1978).

[105] Letter to the author dated Dec. 19, 1979. (For more on this 'Dassault' approach to management see the sub-chapter on the Mirage sale to Belgium and Spain in Chapter 11).

[106] Letter to the author dated July 18, 1980.

[107] Final acceptance proved to be one of the more problematic aspects of the program, but with NADGECO having recognized this early in the program, NADGEMO obtained the support of MITRE through the DOD. Robert S. Reed of Hughes

elaborated on this point in a letter of the author. "Final acceptance of the system was one of the most difficult problems faced by NADGECO and to a lesser extent NADGEMO and the national governments. Many of the NATO nations had never before been involved in total system acceptance, previous experience in sophisticated electronics being limited to the acceptance of individual pieces of hardware. NADGECO recognized this problem early in the program and solicited and got the support of MITRE through the Defense Department. MITRE worked effectively as an arm of NADGEMO and was generally well qualified to anticipate, prepare for and handle the many technical problems associated with system acceptance of a system as large as NADGE. This aspect of the NADGE Program by itself was significant enough for an analysis in depth."

[108] C-M (65)70 (the NADGE Organization's Charter).

[109] Interview with the author June, 1978.

[110] originally a Mr. C. Curtis of Hughes was NADGECO President.

[111] Reed later became President.

[112] Letter to the author July 18, 1980.

[113] NADGE Training, is currently conducted at Erndtebruck, FRG, where air intercept and joint maintenance training is provided for military personnel of the NATO nations. NADGE Training was initiated here in December 1976.

[114] (Differing opinions having been expressed on this point though.)

[115] France's Thomson - Houston and CSF were merged shortly after the original competition as part of the late 60's merger wave that struck Europe. Note that

CSF had been part of the losing ITT consortium and that mergers have since made the setting up of such competitions as occurred with NADGE more problematic.

[116]The NATO AEW/Ground Environmental Integration Segment (NAEGIS) proposal was submitted to NAPMA by Hughes for a $300 million contract effort involving modification of 54 NADGE sites. NAPMA decided this was too expensive and reduced the effort to one involving only 34 sites for $162 million.

[117]Letter to the author, March 9, 1978.

[118]NADGE/D/3-5-01/215, p. 6.

[119]Ibid., pp. 6-7.

[120]Ibid., p. 7.

[121]This aspect of the project represents a particularly interesting example of the sort of arrangements that are resorted to in transnational ventures.

[122]NADGE/D/3-5-01/215, p. 48.

[123]Ibid., p. 50.

[124]Ibid.

[125]'Sensitive', referring to the issue of sovereignty as well as that of security vis-a-vis the contractor.

[126]NADGE/D/3-5-01/215, p. 52

[127]Actually, the insertion of an arbitration clause into the contract was prohibited by law in Greece and Turkey, and NADGECO had to negotiate a special arbitration clause in the FRG since German law didn't allow the government to accept the standard NATO clause, only its own version. This lack of an arbitra-

tion clause in 2 of the 9 contracts had been a problem for NADGECO during the bidding "...but we decided to live with it, accepting it as one of the risks, and submitted our bid anyway." Conversation with Robert Reed.

[128] NADGE/D/3-5-01/215, pp. 8-10.

[129] Ibid., pp. 10-11.

[130] Ibid., p. 11.

[131] Ibid., p. 12.

[132] Ibid.

[133] Ibid., pp. 12-13.

[134] Ibid., p. 13.

[135] Ibid.

[136] Ibid., pp. 13-14.

[137] Ibid., p. 14.

[138] Ibid.

[139] Ibid.

[140] Ibid., p. 15.

[141] Ibid., p. 16.

[142] Ibid.

[143] The NADGE program's payment schedule was downpayment-25%, program payments-65%, final-10%.

[144] NADGE/D/3-5-01/215, p. 33.

[145]Ibid., pp. 40-41.

[146]Interview with Robert Reed, November 1979

[147]The NATO Programming Center (funded by NATO's Military Budget as part of the SHAPE budget) handles software for the NADGE System.

[148]"UKADGE," International Defense Review, No. 5/1979, p. 772.

[149]"Companies Bid for New U.K. Air Defense Upgrade", Aerospace Daily, May 2, 1979, p. 14.

[150]"UKADGE Updates," op. cit., p. 772.

[151]T.J. Loveland, Letter to the author, December 19, 1979.

[152]Ibid.

[153]"Westinghouse Joins UKADGE Bid Consortium," Aerospace Daily, Nov. 8, 1979, p.47

[154]"U.K. Air Defense Award Made," Aviation Week & Space Technology, September 8, 1980, p. 26.

[155]Brown, 1980, op.cit., p.19

[156]Wall Street Journal, May 9, 1979, p. 40.

[157]T.J. Loveland, op. cit.

[158]"West Germany Buys Hughes System," Aviation Week and Space Technology, August 7, 1978, p. 17.

[159]T.J. Loveland, op. cit.

"EIFEL" is the acronym for a German command and control system designed for a national mission somewhat analogous to the U.S. World Wide Military Command and Control System (WWMCCS). It uses the Siemens 4004/45 computers and Siemens and German government-developed software.

[160]Brown, 1980, op. cit., p. 70.

[161]Ibid.

[162]Ibid.

[163]Ibid., p. 20.

[164]Michael Feazel, "NATO Plans to Fund Air Control Studies," Aviation Week & Space Technology, January 10, 1983, p. 79.

[165]Ibid., p. 81

[166]Ibid.

[167]Ibid., p. 82

[168]Ibid., p. 87

[169]Ibid.

[170]Ibid.

[171]Boyle, Dan, "The NATO Identification System", Interavia, 3/1980, p. 201.

172For an explanation of how the CNAD and TSGCEE fit into the NATO Organization the reader is referred to subsection A.2.a of Chapter 5.

[173]Brown, 1980, op.cit., p. 32.

[174] Ibid., p. 204.

[175] Ibid., p. 202.

[176] Brown, 1980, op.cit., p. 32.

[177] Ibid.

[178] T.J. Loveland, Letter to the author, Oct. 17, 1979.

[179] "Northrop Receives New Contract for NATO Aerial Target Services," Aerospace Daily, August 15, 1979, p. 241.

[180] Vandevanter, op. cit., p. 96.

[181] Ibid., pp. 96-97.

[182] Ibid., p. 97.

[183] Ibid., p. 97.

[184] T.J. Loveland, Letter to the author, Dec. 19, 1979.

[185] Wall Street Journal, May 14, 1975, p. 5.

[186] "Northrop's NAMFI Contract Extended through 1984," Aerospace Daily, July 16, 1980, p. 87.

Chapter 4

NATO LOGISTICS

Even though logistics support within the North Atlantic Alliance remains a national responsibility, the member states have been able to realize a limited degree of interdependence in this area. Most interallied logistics cooperation is under bi-lateral arrangements. Nations procuring a foreign system often find it best to plug into the originating nation's existing logistics support pipeline (e.g. the FRG for the Leopard I and the U.S. for the F-16). Though these bi-lateral relationships show no fundamental difference from similar extra-alliance bi-lateral relationships such as those existing between the U.S. and Taiwan, or France and the Ivory Coast, for various weapons systems— such relationships within the alliance tend to be much denser. There are also those bi-lateral logistics arrangements that are not system specific. Nevertheless, although inter-allied bi-lateral relationships are not beyond the scope of NATO logistics, they will not be treated in this paper, except in a most cursory manner.

There are however, in the field of interallied logistics support, two institutions that are specific to NATO, both being NATO Production and Logistics Organizations. They are the Central European Operating Agency (CEOA) and the NATO Maintenance and Supply Organization (NAMSO). The CEOA directs the operations of the POL pipeline network; located in France, the FRG and the Benelux countries. Its membership includes these five host nations plus three user nations: Canada, the U.K. and the U.S. Unlike the CEOA, NAMSO's membership is

alliance-wide (i.e., including France, while excluding Iceland who has no armed forces). NAMSO is an agency whose task is to supplement and support the national logistics systems for certain commonly held communications, radar, and weapon systems.

A. CEOA

1. The Perspective of the mid-50's

In order to place in its proper perspective the evolution between 1954 and 1957 of NATO's first civil agency, the Central European Operating Agency, it is worth while citing several excerpts of an article reproduced in the NATO Letter of February 1956, pp.26-34, entitled "Legal Problem Set by the North Atlantic Treaty Organization".[1]

In examining the articles of the North Atlantic Treaty of April 1949 (which were "imbued with respect for the sovereignty of member states"), the Status of Forces Agreement of June 1951, the Ottawa Agreement of September 1951, the military organization, the International Staff/Secretariat, the Infrastructure Program's contracting procedures (i.e., terms and conditions of bidding, contractor selection, machinery for dealing with disputes), the author asserted that NATO represented "essentially, an interallied body" (be it a highly developed one), and that "despite appearances the juridical personality of NATO does not extend to the field of international law." Although ....."it would be an overstatement to say that NATO had no legal existence in its own right"..., since NATO, its Headquarters and several other agencies were legal entities, this was rather to emphasize the point that the ..."prerogative conferred on any of them by this status can be used only in the field of civil law, not that of public international law".

---

[1] Previously published in the review Centre d'Etudes de Politique Etrangere, December 1955 under the title "Problems Juridiques de L'OTAN".

Therefore, he continued, "NATO is not a supranational institution like the European Coal and Steel Community is,[2] or as the EDC[3] would have been. It can not even be regarded as international, at least in the sense that the United Nations and its specialized agencies are, for they seem to have been, codified once and for all and to have specific characteristics which enable them to develop and work within a legal framework outside that of their member states." The author concluded, regretting that, even though the Organization had no authority in itself and still had "...such a long way to go before it becomes even the starting point of the Atlantic Community,... there was still the possibility of a progressive transformation of NATO, that would allow the Alliance...to find expression in simultaneous action along parallel lines rather than immediate application of the decisions of a directing body. And, as Corneille once said, 'Le temps est un grand maitre, il regle bien les choses."

The above conclusion is understandable and for the most part valid, when seen from the perspective of 1955. However, as this paper will show, a framework has gradually been built up since that time, which has allowed the Organization to not only further evolve as an effective forum for cooperation in defense procurement along parallel lines, but assume as well a quasi-supranational status through subsidiaries, for specific functions and projects.

And, even though the alliance is still severely constrained by divergent national interests and the prerogatives of national sovereignty, and therefore dependent

---

[2]The precursor of the European Economic Community.

[3]European Defense Community.

upon obtaining a consensus among the participants of a given project or organization (with the resultant suboptimal use of resources), an increasingly dense network of relations has continued to develop for interallied collaboration in defense procurement. The Central European Operating Agency played a significant role in this evolution.

2. The CEOA: A Proto - NPLO

An important element of the NATO Infrastructure Program has been the construction of POL pipelines and storage facilities. The system's construction began in 1953, with the major part of the work being accomplished over the next several years. By 1965 the then current NATO requirement had been completely met.

POL makes up over half of the bulk requirement for supplying a modern military force. In order to avoid bottle-necks in the conventional transportation system (rail, barges, and truck tankers), NATO authorities had decided in the early 50's to build pipelines connecting a number of Atlantic and Mediterranean ports to the main deployment areas of central Europe.

NATO's Pipeline system consists of some 10,000 kilometers of pipeline, and storage for about 2 million cubic meters of fuel. The system is divided up on a regional basis, with over half of it (6,000 kilometers) in an integrated network in Central Europe, the Central European Pipline System (CEPS), managed by the Central European Operating Agency (CEOA). The CEOA manages that part of the network located in France, the FRG and the Benelux countries. The remainder of the network is divided up into 5 separate systems on a national basis for:

Norway; Greece; Turkey; Italy; and Denmark (including part of northern Germany). Operation and maintenance of the system in each of these countries is undertaken by the national pipeline organizations, while consulting with NATO military authorities.[4]

Since the NATO Infrastructure Program applies only to capital investment in certain fixed military facilities, and not to the operation thereof, NATO needed some sort of multinational organization to handle the operation of the system in Central Europe that would be more responsive than the usual multilateral methods.

This requirement, for which there was no NATO precedent, led to the establishment by the North Atlantic Council (NAC) of a Working Group on the Control, Operation and Maintenance of the NATO Pipeline System in May, 1954. After six months the Working group reached agreement "in principle" on the system's being run by a civilian agency, (instead of by SHAPE). But then who would control the agency, and who would be contracting for the operation of the system (i.e., what would be the agencies legal personality?). Herein was a direct clash between the prerogatives of national sovereignty and the necessity of managing an integrated system. After another nine months the Working Group presented a report to the NAC. However, it was almost another two years before the conflict of civilian versus military control was finally resolved. The CEOA was finally set up in July, 1957.[5]

---

[4] NATO: Facts and Figures, NATO, Brussels, p. 145.

[5] Hochmuth, Milton S., Lt. Col., USA, Management Problems in Multinational Production of Weapon Systems: The Nato Hawk Program, Industrial College of the Armed Forces, Wash., D.C., Thesis No. 73, 30 March 1963.

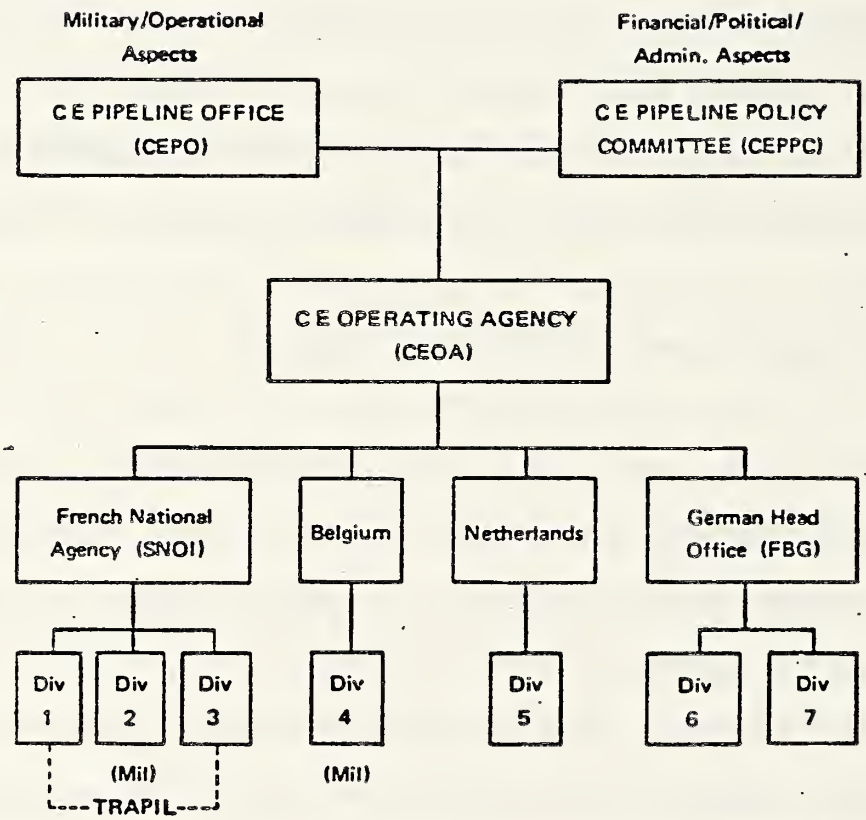
Meanwhile, in July, 1956 a NATO Pipeline Committee had been set up (with all NATO members represented) to supervise, in consultation with NATO Military Authorities, the operation and maintenance of the whole NATO pipeline network (i.e., five nationally run systems plus what was to become the CEOA).

Under the NATO Pipeline Committee in the organizational pyramid came the two Central European bodies to which the CEOA was jointly responsible. These policy level bodies are the Central European Pipeline Policy Committee for financial, political and administrative matters whose members include the five host and three user nations, and the Central European Pipeline Office which is integral to SHAPE for the purpose of providing military guidance.

The CEOA, reporting through this chain of committees is the agency responsible for the general management of the system. The CEOA is an internationally staffed civilian organization under the direction of a general manager. In spite of this rather thick layer of supervisory bodies, and the fact that the agency is a subsidiary unit of NATO, its association with NATO is quite limited. As is usual for NATO subsidiary agencies, 'NATO' supervision consists of little more than the requirement for an annual report to the North Atlantic Council. It's the ad hoc groups of 3 to 14 NATO member states that actually control these subsidiary agencies.

For the actual day-to-day operation of the various parts of the system, the CEOA contracts with the respective agencies in the host nations, which each manage their own national divisions — there being 3 divisions in France, 2 in the FRG, and 1 each in Belgium and the Netherlands. The Belgians and Dutch manage it

NATO Central Europe Pipeline System (CEPS)



Notes:
SNOI — Service National des Oléoducs Interallies
FBG — Fernleitungs-Bertriebsgesellschaft

Source: DMS

through their Ministries of Defense, and the FRG has a separate organization, the Fernleitungs Betriebsgesellschaft (FBG) which manages its two divisions. The French use a semi-governmental and semi-private entity, TRAPIL to manage its three divisions, supervised by the governmental Service National des Oleoducs Interallies (SNOI).

One of the principal tasks of the CEOA has been to obtain sufficient commercial use of the system in peacetime, so as to maintain it in a state of readiness and enable it to cover a high proportion of its operating costs. Although this has worked out well, in the early days, the divergent national interests made this somewhat of a point of contention. The U.S., being the major user of the system, wanted the pipelines more frequently used by commercial firms so as to increase the pipeline's revenue, and decrease the cost to the U.S. On the other hand the five host nations, France especially, were interested in limiting its commercial use due to this bringing the NATO facility into greater competition with their national commercial fuel carriers[6]. In any case this is no longer a problem area since some 80% of the pipeline's movement has been commercial. About 75% of a total annual cost of around $60 million for maintaining and operating the pipeline is being recovered by charging commercial and military users[7]. The remaining deficit of 25%, or $15 million, is covered by assessments against the user nations.[8]

---

[6] Vandevanter, Elliott, Brig. Gen., USAF (ret.), <u>Common Funding in NATO</u>, The Rand Corporation, June, 1967, pp. 86-87.

[7] Interviews with T. J. Loveland, Director Infrastructure and Logistics Division, U. S. Mission to NATO, June, 1978.

[8] (The original U.S. share of this deficit, 36%, has since been reduced to 25%).

One of the principal problems that the CEOA has continued to face, stems from the fact that it was originally built as a wartime military pipeline and during a period of time when the cost of labor (either in or out of uniform) was inexpensive. Consequently, the pipeline's diameter is too small and labor saving devices are lacking. It is therefore not as inexpensive to operate and maintain as it might have been, had it originally been built for commercial operation.[9]

The significance of the CEOA was that it had no peacetime precedent, and during its gestation period between May 1954, and July 1957, NATO produced its first multinational civil operational decision making mechanism that set the pattern for future multinational NATO subsidiary organizations.

The first two of these were the NATO Maintenance and Supply Organization (NAMSO set up in 1958, and the NATO Hawk Management Organization set up in mid 1959, the latter being the first instance of such an agency for a weapons production project. The CEOA was therefore the first of NATO's functional agencies whose organization and status were to be formalized in April, 1962 under the "Regulations for NATO Production and Logistics Organizations," NATO Unclassified, Document C-M (62) 18, as NPLO's.

[9] Loveland, op. cit.

B. THE NATO MAINTENANCE AND SUPPLY ORGANIZATION (NAMSO)

1. History

In 1958 the North Atlantic Council created NATO's second logistics agency, a year after the Central European Operating Agency had been set up, the Nato Maintenance And Supply Organization (NAMSO).

"Non-profit-making and self-supporting in character, and international in outlook, NAMSA is motivated by a simple philosophy, which is that by providing centralized maintenance and supply management, it is possible to consolidate nations' requirements, to stock spare parts centrally and to make bulk procurement which results in furnishing maintenance services and parts more cheaply and quickly than is possible when a number of individual nations make their own arrangements, sometimes in competition with each other."[10]

The original initiative for setting up NAMSO came from the U.S., who put forth a proposal for the formation of a regional spare parts and maintenance organization in December, 1957, at a meeting of the North Atlantic Council (NAC). The primary aim of the U.S. initiative was to create a NATO funnel through which it could channel its Military Assistance Grant Aid Program support for system's of U.S. origin that were no longer in the U.S. inventory. In April, 1958, the NAC approved the establishment of a central organization—a task that was greatly facilitated by the CEOA precedent. The organization was originally known as the

[10] The Foreword of NAMSA: Facts and Figures, written by Major General H. Gentsch, General Manager, NAMSA.

NATO Maintenance Supply Services System (NMSSS), and its operating agency, NMSSA, later becoming NAMSO and NAMSA[11] respectively after a 1964 reorganization[12].

Prior to NMSSA's establishment, much of this work had been accomplished by groups of experts working with the Spare Parts Coordination Section within the Production and Logistics Branch of the International Staff/Secretariat. Studies were done for the development in Europe of facilities for the production of spare parts for the considerable quantities of American equipment in the hands of European allies. Simultaneously, as these spare parts needs had grown larger, U.S. firms had also grown more reluctant to manufacture, and the U.S. government more reluctant to supply them. Recourse was ultimately made to a semi-autonomous NATO agency, NMSSA and the Section of the International Staff/Secretariat was dissolved.

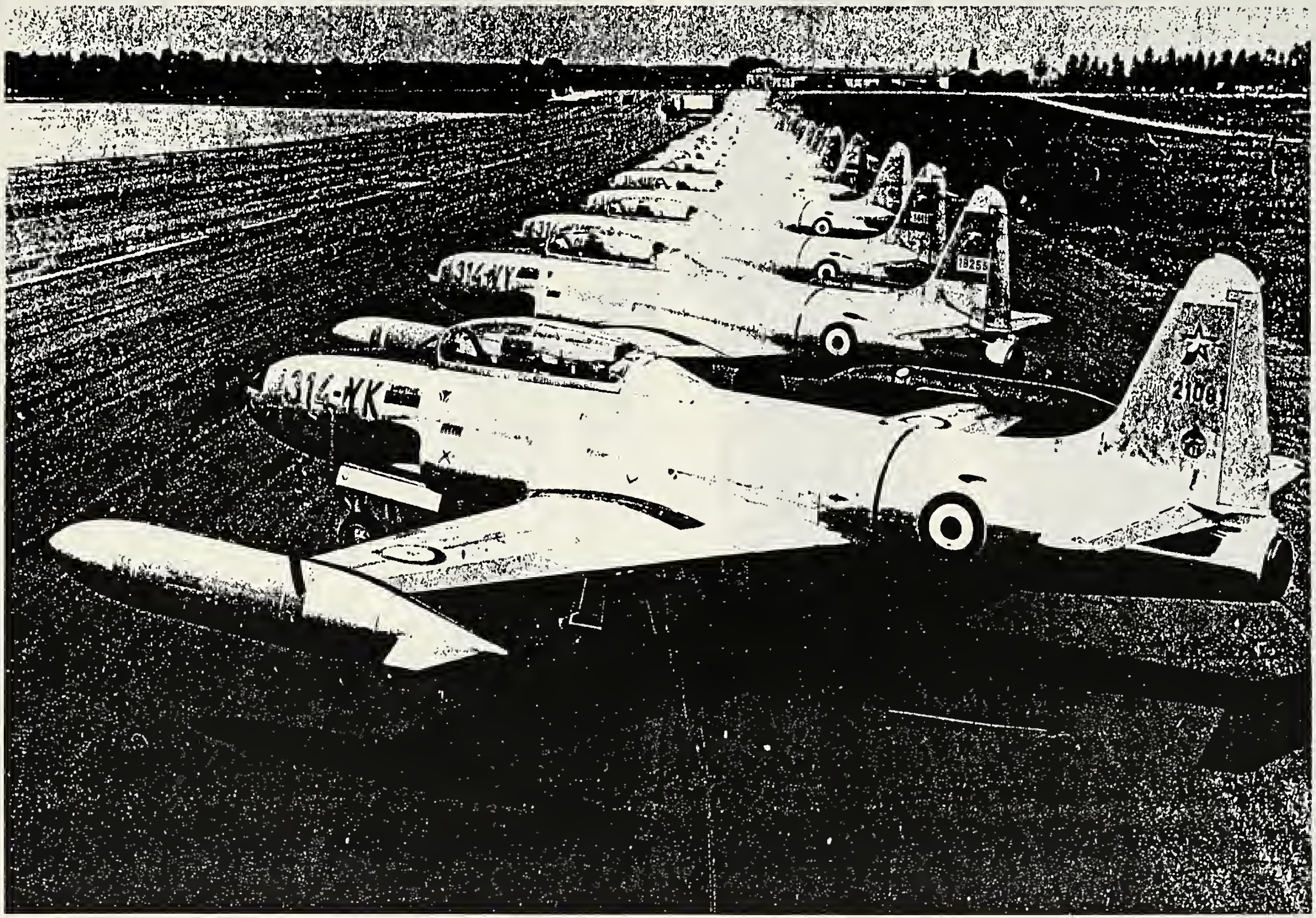
Due to a lack of support from France and the FRG, however, the NMSSS was not able to immediately become an operational activity. In 1959, the U.S. decided to use the authority of the NAC resolution of the previous year to break the stalemate within NATO by proceeding unilaterally. The U.S. Air Force was designated to make the necessary arrangements with the NMSSS and French officials for the initiation of operations. The NATO Supply Center (NASCC) was established as an

---

[11] NAMSA - NATO Maintenance and Supply Agency.

[12] Carver, Charles F., Major, USAF, and Walsworth, David, H., GS-13, DAFC, An Examination and Evaluation of the NATO Maintenance and Supply Organization, a thesis presented to the faculty...of the School of Systems and Logistics of the Air Force Institute of Technology (AFIT), Air University, in partial fulfillment of the requirements for the degree of Master of Science in Logistics Management, Committee Chairman, Leslie M. Norton, June 1976, p.30.

Les T 33 sont entrés en service dans l'Armée de l'air le 14 août 1951.



Source: Air Actualites

Source: Air Actualites

operating agency of the NMSSA using DOD funds and the USAF depot facilities at Chateauroux (in central France). The USAF also temporarily assumed managerial responsibility—which it retained until July, 1961.[13]

In 1960 the NASCC finally managed to receive the active participation of the other members due to several developments:

(1) The French government agreed that the Chateauroux facility could become the permanent NATO Supply Center.

(2) The U.S. and the FRG agreed to collectively pay the inventory cost of setting up the Five Aircraft Program (i.e., F-84, F-86, C-47, C-119, and T-33)[14]

(3) SHAPE decided to let the NMSSS assume weapon systems manager responsibility for the 50 Fiat G-91 (the NATO Lightweight Strike Reconnaisance Fighter), that the U.S. was planning to provide as U.S. Grant Aid to Greece and Turkey (this effort was actually cancelled in 1961 by the incoming Kennedy Administration, with the U.S. providing the two nations F-104s off the North American production lines instead).

Between 1960 and 1964 there was rapid expansion of operations, which included providing support to: the Nike surface-to-air, and Honest John surface-to-

---

[13]Ibid., pp. 30-31.

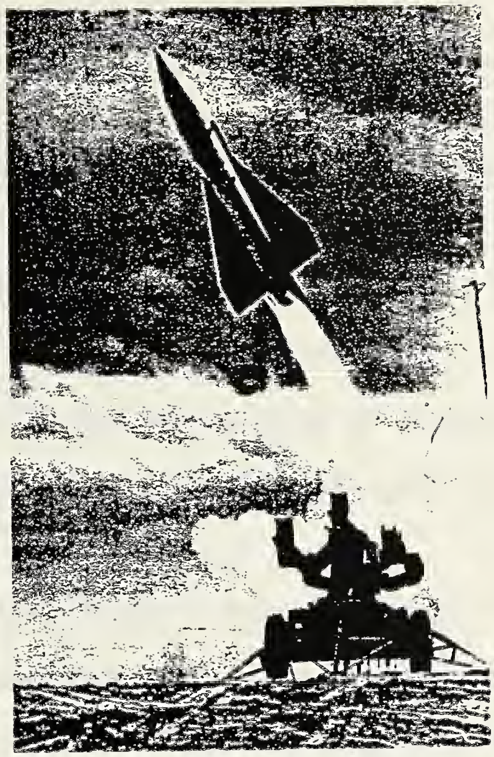
[14]The initial U.S. investment in the program came from a Grant in Aid of some $55 million, mostly in the form of spare parts and tools left over from previous U.S. programs. This amount was reimbursed to the U.S. from user charges.

surface missiles procured by European NATO members; and the NATO Infrastructure Program funded ACE-High (communications) and Early Warning systems.[15]

During this period of rapid expansion, however, the NASCC developed serious management control problems. The NASCC's logistic support deteriorated due to its being unable to maintain adequate inventories or records. In late 1963 and early 1964, management techniques were improved and the NMSSS and its agencies were reorganized, the NMSSS becoming NAMSO, the NMSSA becoming NAMSA and the NASCC becoming NSC. As an indication of support for the new arrangements, NAMSO received support responsibility for the F-104G fighter in late 1964, and in the same year negotiations were initiated for NAMSO support of Sidewinder air-to-air and Bullpup air-to-surface missiles, and the NATO Missile Firing Installation (NAMFI, on Crete).[16]

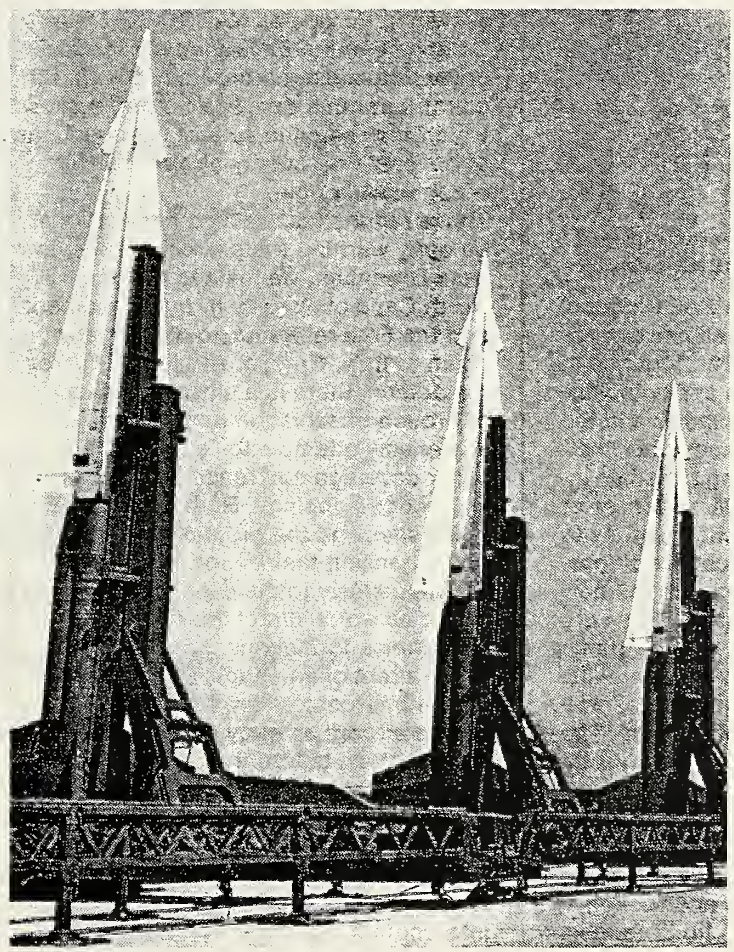
In 1965 the Koblenz Procurement Center (KPC) was formed, creating NAMSA's second operational center, responsible for procuring spare parts for those nations possessing the F-104G. In the same year NAMSA also took on the responsibilities for complete supply support of the Sidewinder, and calibration support for the Hawk surface-to-air missile. In 1967, NAMSA assumed some limited advisory and support functions for the NATO Air Defense Ground Environment program (NADGE). The following year, 1968, support for NADGE was expanded to include a 30,000 line item, twenty-one month NADGE support equipment procurement contract. This contract represented a major expansion outside the scope of its original supply and maintenance functions into the procuring of equipment financed by the NATO

[15] Carver and Walsworth, op. cit. p. 32.
[16] Ibid., pp. 33-34.



▲ Raytheon's Hawk air defence missile system

Source: Interavia



German Air Force: Nike Hercules Photo: Ministry of Defence, Federal Republic of Germany

Source: NATO's Fifteen Nations

Infrastructure Program—and thus represented another step forward for integrated logistics. Also in 1968, NAMSA undertook responsibility for stocking Hawk spare parts, and relocated to Capellen, Luxembourg. Despite these new responsibilities its staff had to be cut in the same year due to a decreased work load, stemming from the phasing out by European nations of many of the US MAP provided weapon systems the agency had originally been set up to support.[17]

In 1969, NAMSO undertook the procurement of NADGE Maintenance spares. In the same year a Working Group was set up to study NAMSO management problems. After the two year study, the Working Group's 1971 recommendations led to a tightening of NAMSA's management procedures and management tasks. In 1972, NAMSA's third Operational Center, the NAMSA Southern Depot in Taranto, Italy began operations for supplying spare parts to Italy, Greece, and Turkey. In 1975, logistics support responsibility was transferred from the NATO Hawk Production and Logistics Organization (NHPLO) to NAMSO, thus leading to the establishment of NAMSA's fourth Operational Center, the NAMSO Hawk Logistics Management Operational Center. The Hawk maintenance activity is located near Paris[18] while its supply activity is at Capellen, Luxembourg. Also in 1975, Canada, which was the only NATO Member not a member of NAMSO (excepting Iceland which has no armed forces), finally joined.[19] The Koblenz Procurement center was closed down in 1976, bringing the number of operational centers back down to three, and F-104G parts are now procured by the NATO Supply Center in Capellen, Luxembourg. A new,

---

[17] Ibid., pp. 35-36.

[18] and co-located with the NATO Hawk Production and Logistics Organization (NHPLO).

[19] Ibid., pp. 37-38.

operational center was being set up, as of early 1980, in Fort Bliss, Texas—the European NIKE Training Center. Its purpose is to train European NIKE maintenance technicians.

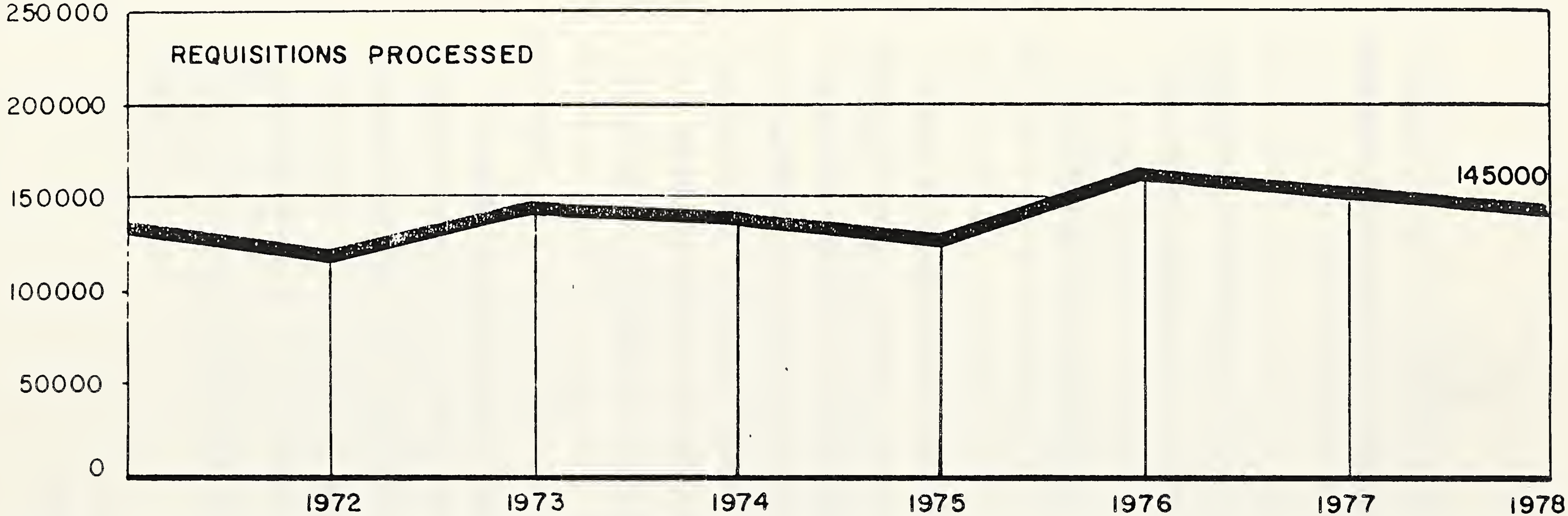
As of 1978 NAMSO's turnover, in terms of the value of contracts for supplies and services awarded to industry totaled $180 million of which some 60% was for the supply of spare parts and 40% for maintenance and repair. During the same year there were 145,000 requisitions processed, and 21,000 items were received for repair[20] (see following charts).

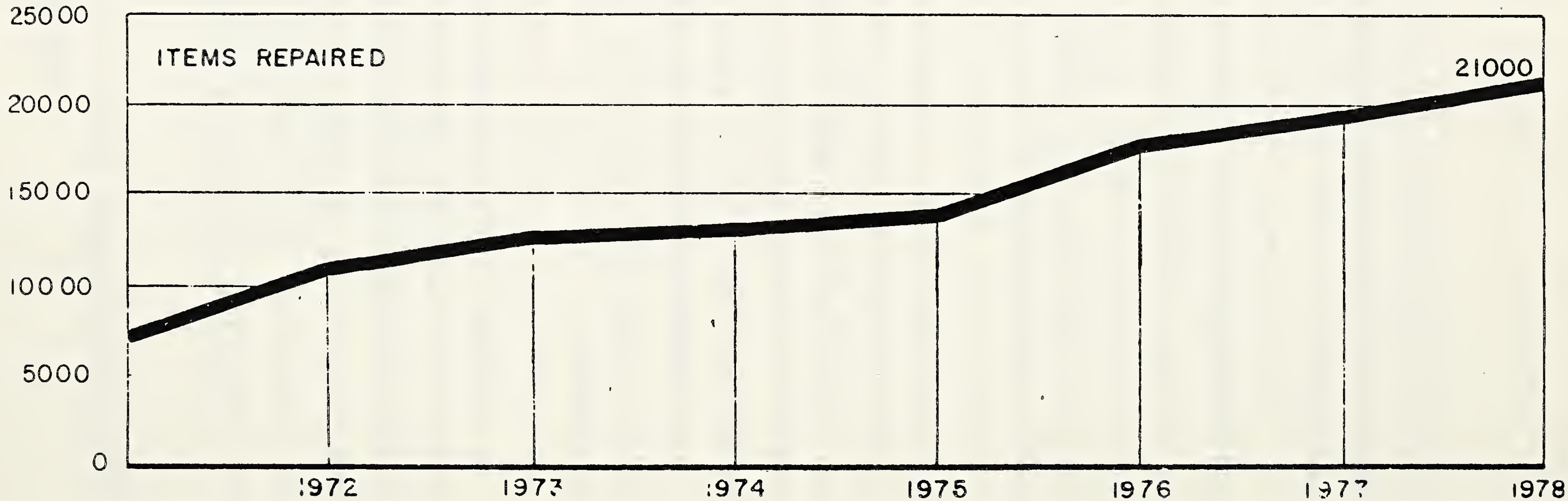
Several other tasks that are performed in-house and which therefore are not included in the annual turnover amounts for those contracts awarded to industrial firms are: configuration management of equipment used in the NADGE radar sites; preparation of technical manuals, and assistance in the training of personnel working at these NADGE sites; calibration in NAMSA's calibration laboratory, and by teams on-site, for the NIKE and Hawk battalions and in the Early Warning Stations; and depot level repair work of Lance and TOW assemblies for ten European countries.

In its early days, NAMSA had only been invited to support a weapon system or equipment once it was already operational. However, since the late 60's it has also been increasingly involved during the design and initial production phases, thereby assisting in a much smoother transition into the follow-on support phase after production and initial introduction into operation of the system involved. Three examples are:

[20] NAMSA: Facts and Figures, Annexes III and IV.

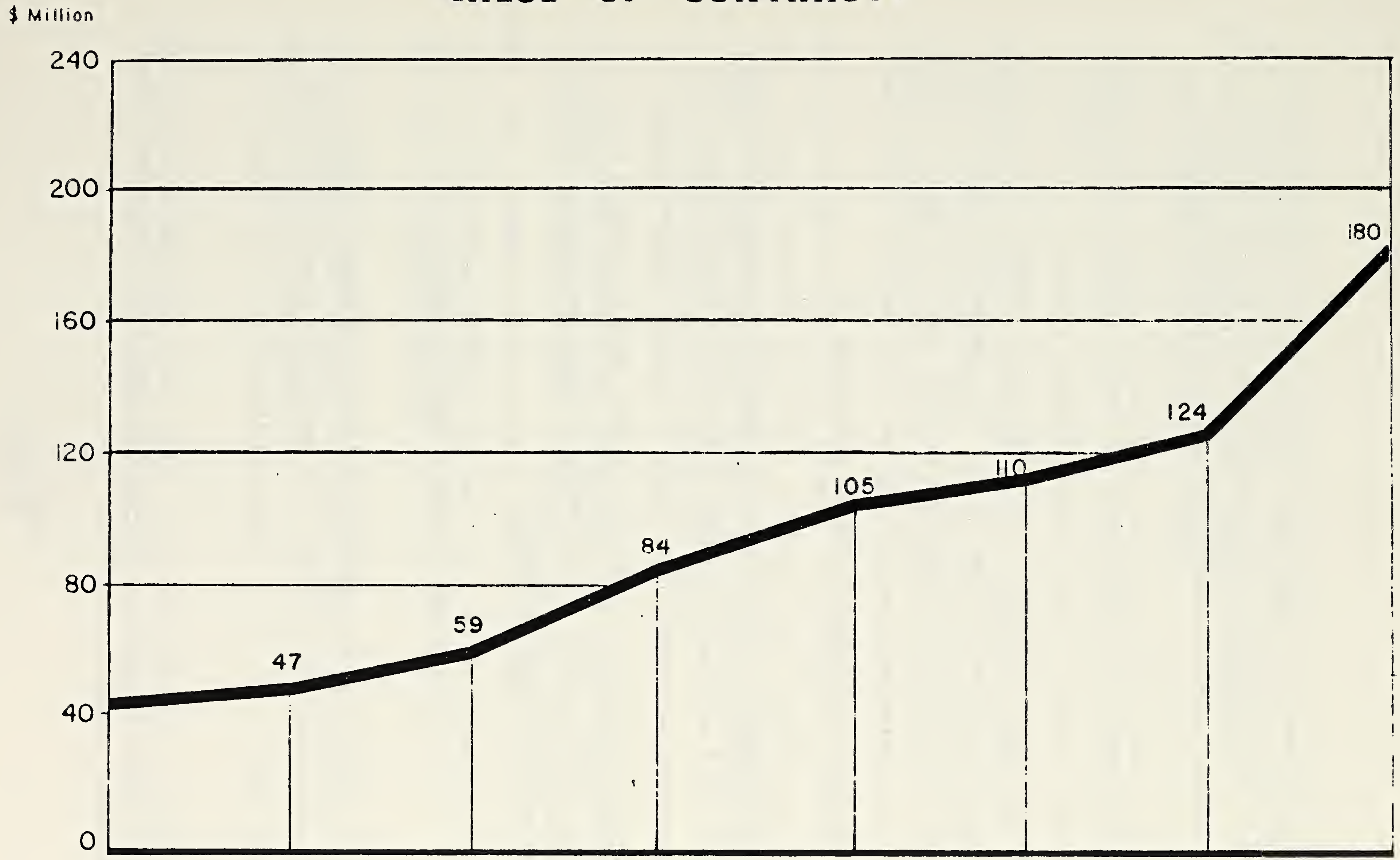
VOLUME OF ACTIVITIES





SOURCE: NAMSA - Facts and Figures

VALUE OF CONTRACTS



SO : NAMSA - Facts and Figures

a. The establishment of a NADGE Project Office with 4 full-time employees at NAMSA to perform specific tasks for NADGE connected with provisioning, codification, technical documentation, and tools and test equipment.

b. The establishment of a LANCE planning cell with 3 employees within existing NAMSA staff to work in conjunction with European countries to establish a NAMSA-NSC Program Office after these countries had decided to buy the LANCE surface-to-surface missile from the US. The subsequently created NAMSA-NSC Program Office now provides extensive follow-on logistic support, including depot-level maintenance for electronic and optical equipment, and has meanwhile taken on the support of TOW and DRONE AN/USD 501.

c. The establishment of a NATO Integrated Communications System (NICS) Project Branch with 4 employees in the NAMSA Communications Program Office to perform planning and initial support tasks for the NICS Management Agency (NICSMA) and NICS Central Operating Authority (NICS-COA) related to the series of NICS projects, in such fields as supply, maintenance, documentation and configuration management.[21]

2. Financial Support and Distribution of Contracts

Financially, operating as an independent self-supporting agency, the cost of operations are borne by the customers (i.e. NAMSO member countries,[22] and any NATO bodies using its services). Various solutions exist for the financing of

[21] Logistics Support Proposals for NATO-AEW from NAMSA, NAMSA, July 1978, p. 14.
[22] The FRG alone, accounting for a third.

the activities of the individual Programs. Two basic principles, applying both to administrative and operational budgets, however, are mandatory:

- NASMA operates on a no-profit/no-loss basis;
- the balance of income and expenditure must be achieved for each individual program.

The Organization is basically financed through: surcharges; payments by customers involved in establishing a particular program; accessorial and service charges to customers for sales or services by NAMSA: or by pro-rata

contributions based on a cost sharing formula. The NATO Board of Auditors, acting on behalf of the NAC (and thereby all member states), performs the audits of NAMSO (as it does for all other NPLO's) so as to assure that NAMSO operations have been conducted economically and within their budget.

For the maintenance and supply of a given system held by two or more countries, each nation first decides whether it wishes the system to be supported through NAMSA. Then, if several nations choose to work through NAMSA, each selects from among the tasks performed by NAMSA those which, on a cost-effective basis, can be shown to best be performed centrally.

Financial support of NAMSO through orders placed surcharges, and pro-rata contributions breaks down as approximately:[23]

[23]Harold Helex and Wolfgang Flume, "NAMSA: The Waster Opportunity," Military Technology, March 1977, p. 39.

FRG	34%
U.S.A.	10%
Italy	10%
France	9%
United Kingdom	8%
Netherlands	8%
Belguim	6%
Turkey	5%

The other 6 member nations, (Canada, Denmark, Greece, Luxembourg, Norway, and Portugal) collectively account for the remaining 14%.

As of mid-1980, NAMSA is involved to some degree in the logistics management of 18 systems, each involving its own grouping of nations. Since the number of nations participating in each program varies from 3 to 14 and with some participating fully and others only for a limited portion, NAMSA has to bill the nations through some 87 different cost-sharing formulas, 40 of which are for administrative expenses.[24]

International competitive bidding allows for considerable cost savings, but at the expense of being able to distribute work strictly in accordance with the principle of 'juste retour'. With the great majority of NAMSA supported systems of U.S. origin, only 55% of its contracts have been awarded to European firms,

[24] See Appendix for 1979 Cost Sharing Formulae.

SUPPORTED WEAPON OR EQUIPMENT SYSTEMS AND USERS

	BE	CA	DE	FR	GE	GR	IT	LU	NL	NO	PO	TU	UK	US	SHAPE	NAMFI
NIKE MISSILES	*		*		*	*	*		*	*		*				*
HAWK MISSILES	*		*	*	*	*	*		*							*
LANCE MISSILES	*				*		*		*				*			*
TOW MISSILES		*	*		*	*	*	*	*	*	*	*				
SIDEWINDER MISSILES	*		*	*	*	*	*		*	*	*	*				
AIR DEFENSE RADAR	*		*	*	*	*	*		*	*		*	*		*	
COMMUNICATIONS															*	
F.104	*				*	*	*		*			*				
DRONE CL 89					*		*						*			
FH-70 HOWITZER					*		*						*			
TORPEDOES				*	*	*	*		*	*	*	*				
CRYPTO	*		*	*		*	*		*	*	*	*			*	

The following weapon and equipment systems are under review for a possible NAMSA support :

- SP-70 Self-Propelled Howitzer,
- MAVERICK Air-Ground Missile,
- OTO MELARA 76 mm Gun,
- MARK 46 Torpedo,
- AWACS.

In addition to the above, the following users are supported for their specific requirements :

- Major NATO Commands for NATO Integrated Communication System (NICS),
- COMIBERLANT (Commander Iberian Atlantic Area) Communication Center,
- NORTHAG (Northern Army Group) Communication Center,
- NATO Programming Center (NPC),
- CEOA (Central European Operating Agency), limited stockage of 8 inch pipeline materiel,
- NAMFI (NATO Missile Firing Installation), NAMFI Instrumentation Equipment,
- NATO Countries and/or Organizations for all their brokerage requirements.

SOURCE: NAMSA - Facts and Figures

whose governments account for almost 90% of the orders placed through the agency.[25] It's primarily in the area of maintenance that NAMSA has been able to counter this imbalance to any great extent, contracting most of its maintenance work out to European firms. Though Europe comes up short in contract value, NAMSA's procurement policies have nevertheless had a pro-European bias and have at least resulted in a considerable amount of technology being transferred to Europe from the U.S.

---

[25]Harold Helex, and Wolfgang Flume, "Interview with Major General Horst Gentsch, General Manager of NAMSA," Military Technology, March, 1977, p. 40 (hereafter referred to as "Gentsch").

3. Organization

NAMSO is a NATO Production and Logistics Organization (NPLO) set up solely for logistic support. As an inter-allied service organization with no command authority, its purpose is to maximize the cost/effectiveness of logistics support to NATO's national logistics systems for certain commonly held systems. Most other NPLO's are system specific and have the option of transferring their logistics support functions to NAMSO once the initial procurement has been completed.[26]

NPLO's are subsidiary bodies of NATO as provided for in Article 9 of the North Atlantic Treaty and constitute an integral part of the North Atlantic Treaty Organization. NPLO's share in the juridical personality possessed by NATO by virtue of Article 4 of the Ottawa Agreement of 1951. An NPLO's juridical personality allows it to conclude contracts, acquire and dispose of property and institute legal proceedings. As a subsidiary of NATO, an NPLO is exempt from taxes and duties (which is not necessarily the case for all 'NATO' Projects). The immunities, rights, legal, and diplomatic privileges enjoyed by an NPLO allow for conclusion of agreements between the NPLO and its member countries for the implementation of required administrative policies and procedures, and particular customs and financial matters.[27] NAMSO is administratively and financially

[26] As pointed out by H.S. Spaulding, NAMSA's Director of Logistics, in a letter to the author, dated December 28, 1979, "NPLO's do not "generally transfer their logistics function to NAMSO". They should do so but as there is no NATO standard pattern obliging NPLO's to transfer logistics to NAMSA we find it extremely difficult to convince NPLO's and participating nations to close down at the time at which system production for which they were responsible is finished. Once created these organizations tend to stay alive as long as possible."

[27] Carver and Walsworth, op. cit., p. 140.

independent while remaining accountable to the NAC and each member nation. Information and consultation lines exist between NAMSO and NATO's Secretary General, SHAPE, the NATO Air Defense Ground Environment Committee (NADEEC, which assumed some of the functions of the NADGE Organization when it was liquidated in 1977), the F-104G Logistics Working Group, and the member nations.[28]

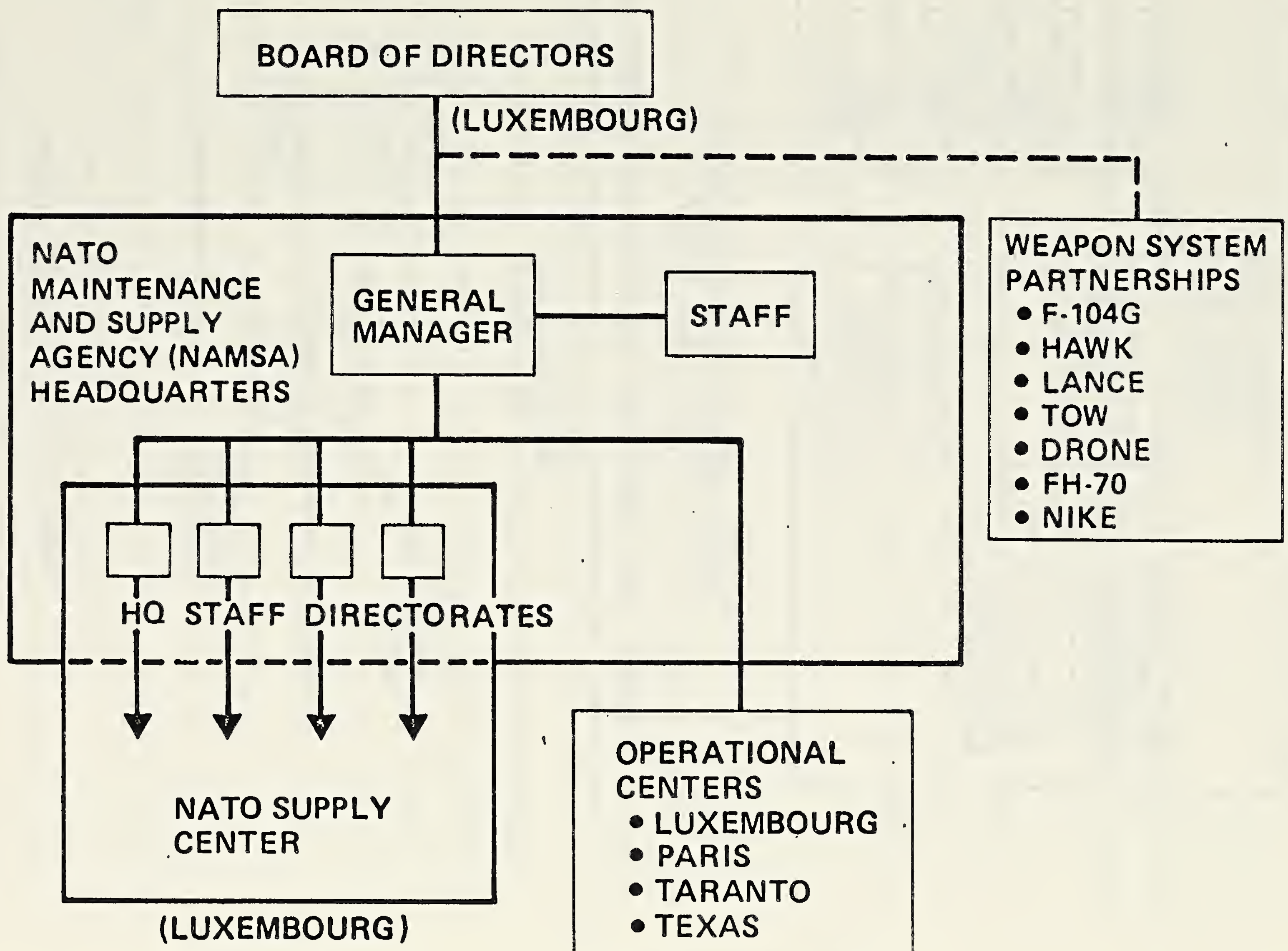
An NPLO Charter calls for a standard form of organization with two levels; policy and executive. The policy formulation or legislative level is where the participating national governments (14 in this case) are represented. This level is commonly referred to as NAMSO, (although NAMSO is sometimes also used in the collective sense, as it is here), and consists of a Board of Directors[29], the Board's two permanent committees, and peculiar to NAMSO, the seven Weapon System Partnership Committees. The second level is the "executive" or operating arm of NAMSO, the NATO Maintenance and Supply Agency (NAMSA), which is responsible to the BOD in carrying out policy and implementing directives.

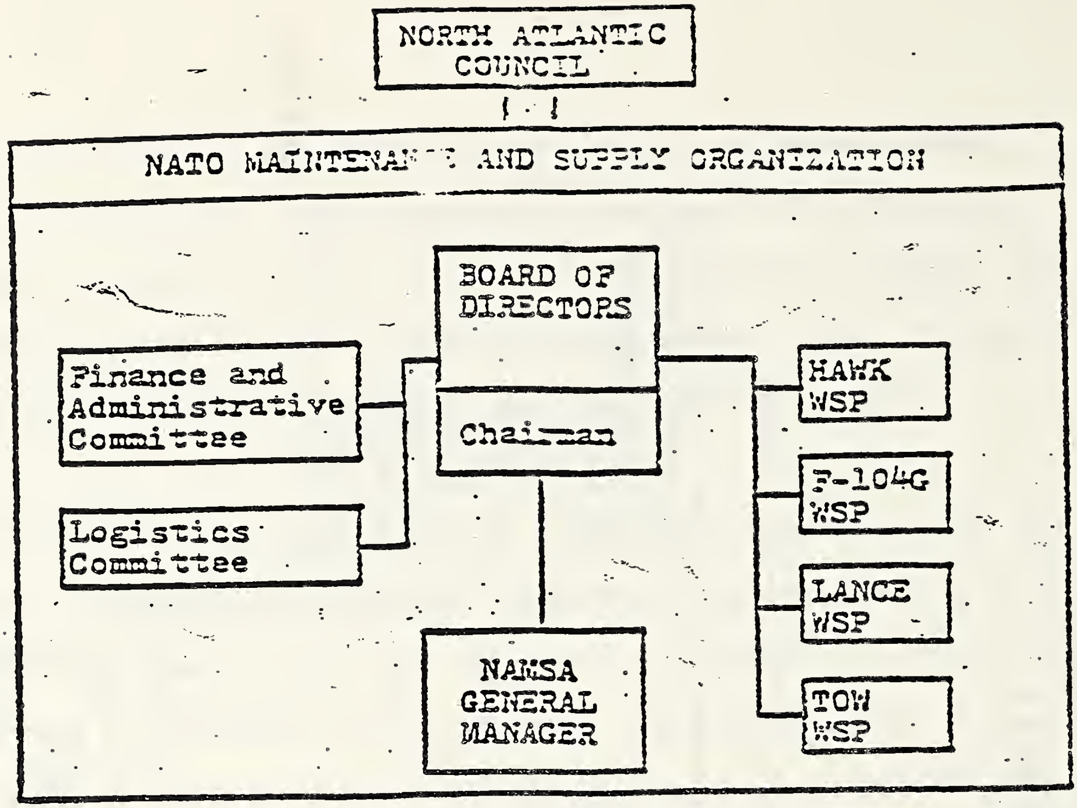
At the legislative level, first we have the BOD which consists of one representative from each of the 14 member countries, each assisted by experts of his national logistics system. The principle of unanimity applies to all general policy, financial issues, and personnel appointments (with the latter being a particularly troublesome area at times). The Board receives technical assistance from 2 permanent committees, the Finance and Administrative Committee, and the Logistics Committee. The Board and these 2 committees share a common full-

[28] Ibid., pp 40-41.

[29] The corresponding body in the only NPLO that antedates NAMSA, the CEOA, was named the Central European Pipeline Policy Committee.

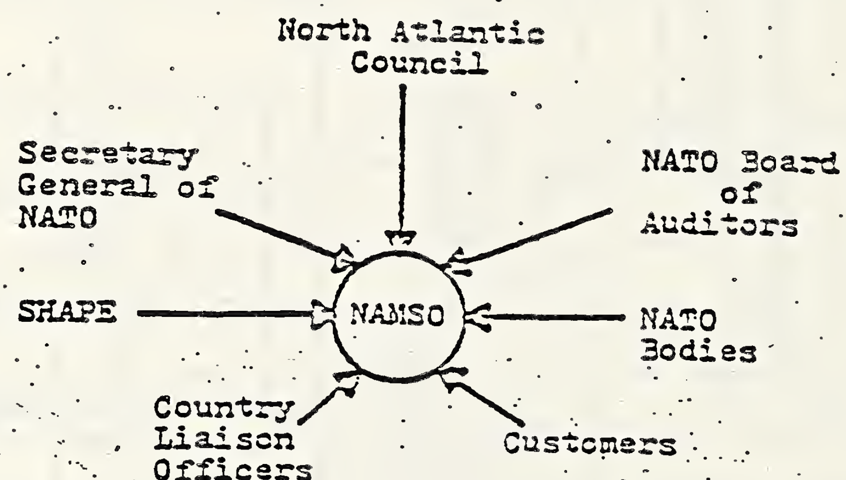
NATO Maintenance and Supply Organization (NAMSO)





NAMSO ORGANIZATIONAL STRUCTURE
"LEGISLATIVE LEVEL"

Source: 1974-1975 NAMSA Annual Data Summary



NAMSO EXTERNAL RELATIONSHIPS

Source: 1974-1975 NAMSA Annual Data Summary

time Chairman, which allows for excellent communications and a high degree of efficiency in working relationships (see chart).

Also, certain groupings of member states that wish to organize for a more autonomous common logistics support arrangement for a given weapon system can establish Weapon System Partnerships (WSP's), with the Board's approval. There are presently seven of these: The Hawk WSP and the F-104G WSP each with their own operational centers up until 1976 as the residual logistics operations of their respective NPLO's, but now only Hawk maintains its own; the Lance WSP; the TOW WSP; the Drone WSP; the FH-70 WSP; and the NIKE WSP.

A particular feature of Weapon System Partnership Committees is that they have power of decision in policy matters concerning the relevant weapon system. Even though the Weapon System Partnerships are an integral part of NAMSO, the members of the WSP mutually agree on the specific methods, procedures and financial arrangements. Such decisions, however, have to be passed through the Board of Directors which makes sure that countries not participating in the Weapon System Partnership are not affected financially or in any other way. Once the WSP's formation has been approved by the NAMSO BOD, a NAMSO Policy Directive is issued defining the division of responsibilities between NAMSA and the WSP participants, financial arrangements, and the basic operating agreements - such as which NAMSO/NAMSA procedures will be followed, and which will be modified or not apply at all. Nations choose to join in these WSP's because they provide the following two advantages which allow for greater tailoring of support:[30]

[30] Carver and Walsworth, op. cit., p. 119.

(1) As in weapon system NPLO's, only those countries participating in a given project define the policy to be followed,[31] and;

(2) National experts and authorities have a more direct voice in the management of the specific weapon system's support.[32]

At the executive level is the Agency, NAMSA, responsible for the implementation of policy. The NAMSA HQ consists of a General Manager and Four Directors:

(1) Administration and Organization
(2) Finance
(3) Logistics
(4) Procurement and Marketing

Each Director wears two hats, one as a member of NAMSA HQ and the other as a Director within the NATO Supply Center (NSC). The HQ staff is completed by a Legal Advisor, and Inspection and Control groups.

The General Manager is responsible to the Board for implementing its decisions and policies, and submitting for its approval the necessary plans and reports required in the NAMSO Charter. The General Manager also exercises contract

---

[31] In the case of the Hawk WSP this has involved going as far as setting up a discriminating margin applied in the comparing of quotes of firms outside the WSP member nations (i.e., U.S. firms) to those from within them. This arrangement was inherited from the NATO Hawk Production and Logistics Organization when NAMSA assumed responsibility for support of Hawk in 1975. If less than 15% above a U.S. bid, a European firm wins outright. If none are within this margin, any European firm that was within 15-30% of the U.S. bid had the right to match the U.S. bid (Loveland, op. cit.).

[32] NAMSA: Facts and Figures, op. cit., p.11.

NAMSA 1980

COUNTRY LIAISON OFFICERS

Be	Cdt.	LECLERCQ
De	Capt.	ANDERSEN
Fr	Capt.	BONDON
Ge	Capt.	KLUTH
Gr	Lt. Col.	KONSOLAKIS
It	Capt.	RANOCCHIARI
Ne	Lt.	BAREMANS
No	Lt. Col.	MORICKE
Tu	Col.	ÖNDER
US	Lt. Col.	CANANT
Po	Maj.	MOREIRA DOS SANTOS

GENERAL MANAGER
H. OMRENG — No

LEGAL ADVISOR
M. VISINE — Fr

INSPECTION/AUDITOR
G. LONDON — US
K. PRICE — UK

DIRECTOR ADMIN.&ORG.
K. LOMAX — UK

- DATA PROCESSING — R. RAUP — US
- MANPOWER — Y. PINGAUT — Be
- PERSONNEL — H. MAAR — Lu
- ADMINISTRATION — A. RUFFA — It

DIRECTOR FINANCE
H. HERZOG — Ge

- FINANCE — H. AYTEKIN — Tu

DIRECTOR LOGISTICS
H. SPAULDING — US

- FH - 70 — N. MEASEY — UK
- CALIBRATION — H. WLODARZ — Ge
- AIR DEFENCE — E. FIRINO — It
- COMMUNICATIONS — J. PLUMIER — Be
- NIKE/SIDEWINDER/TORP. — O. SCHIEFER — Ge
- LANCE/TOW/DRONE — J. SHEPHERD — UK
- AEW & C — A. SIMEON — US

DIRECTOR PROG.&MARK.
B. PETIT — Fr

- PROCUREMENT — D. VERBOOM — Ne
- DATA RESEARCH — H. CROSBY — UK
- TRANSPORTATION — L. KOHN — Lu

NORTHERN DEPOT
L. POLMAN — Ne

SOUTHERN DEPOT
P. GAVIATI — It

HAWK LOG. MGT.
J. COMBES — Fr

ENTC
U. MENZEL — Ge

LOCATION

GENERAL MANAGER & DIRECTORS LUXBG CITY
LIAISON OFFICERS LUXBG CAPELLEN
ALL OPERATIONAL UNITS UNDER DIRECTORS LUXBG CAPELLEN

NORTHERN DEPOT: LUXBG CAPELLEN
SOUTHERN DEPOT: TARANTO ITALY
HAWK: PARIS FRANCE
ENTC (EUROPEAN NIKE TRAINING CENTER) FORT BLISS TEXAS USA

FOR ADDITIONAL INFO CONTACT
NAMSA HQs
B.P. 2161
LUXEMBOURG CITY
17 RUE AUGUSTE LUMIERE

authority delegated to him by the Board. The NSC performs the day-to-day management and operational functions of NAMSA, containing all weapon system Program Managers and the specialized divisions dealing with transportation finance, procurement, depots, calibration laboratories, Electronic Data Processing, and maintenance workshops. The NAMSA Program Managers are each responsible, for one weapon system or major equipment, for all those tasks performed by NAMSA for the users. NAMSA has also established four Operational Centers:

—The Northern Depot located at Capellen, Luxembourg;

—The Southern Depot located at Taranto, Italy;

—The Hawk Logistics Management Activity, having a split location, supply at Capellen and Maintenance near Paris, France, and;

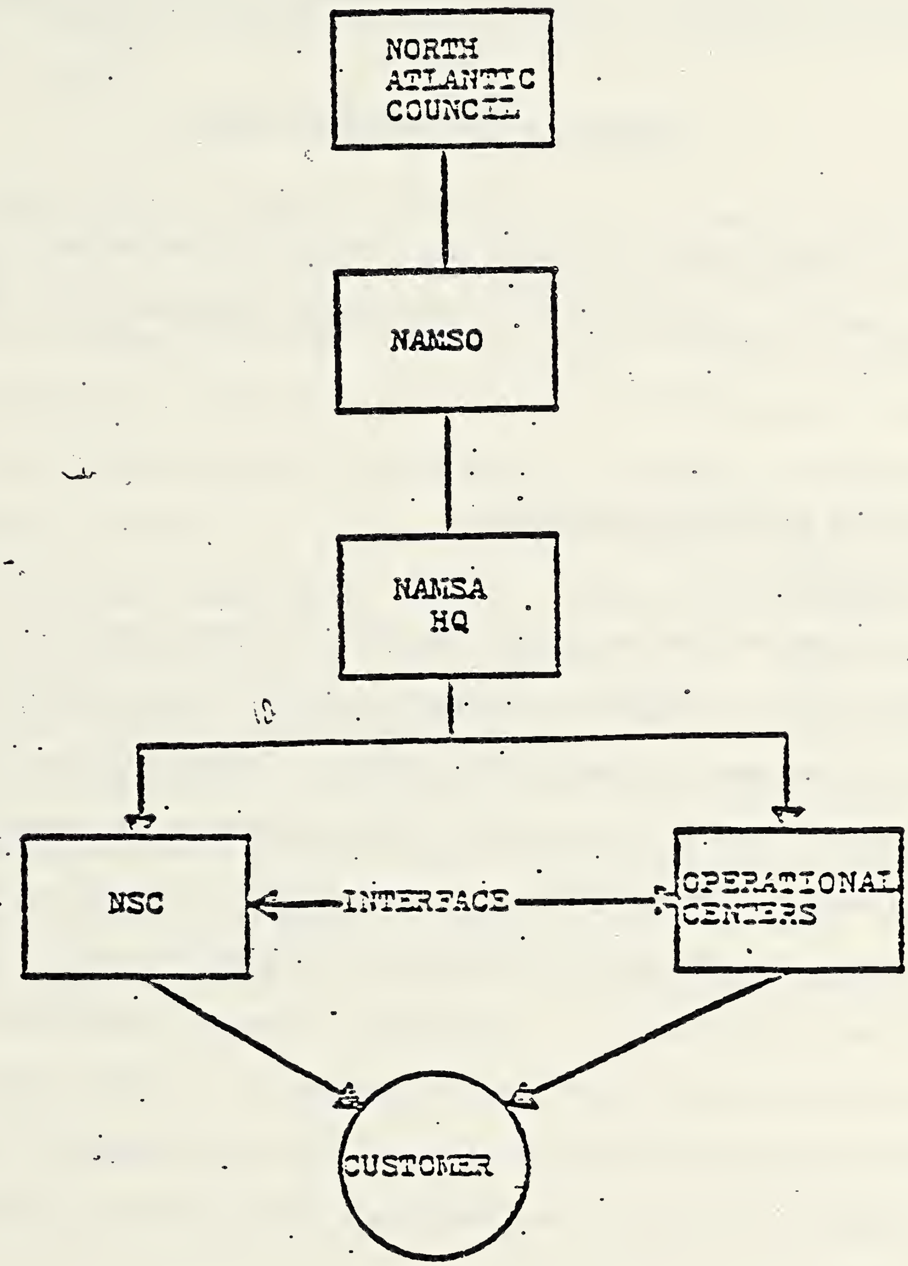
—The European Nike Training Center (ENTC), Fort Bliss, Texas.[33]

NAMSO is staffed by both military and civilian personnel, having fluctuated in strength since the mid-60's at between about 840 and 900 employees - being at the lower end of this range as of 1978. All employees must speak and write English and French, NATO's two official languages. Giving preference to the best qualified candidate; NAMSA endeavours to obtain a balanced distribution of posts among member countries. The recruitment of agents for senior positions has to be confirmed by the Board of Directors.[34]

---

[33]The ENTC was established in 1980. Previously, there had been a fourth operational center at Koblenz (1965-1976).

[34]One personnel related problem mentioned by a former U.S. member of the NAMSO BOD during an interview with the author in June 1978, Mr. Stanley Beck, is the excessive politicization of the organization in the selection of senior personnel. France and Italy, and especially the latter of these two, devote a disproportionate amount of their energy to this area.



NAMSO ORGANIZATIONAL STRUCTURE

Source: 1974-1975 NAMSA Annual Data Summary

NAMSO operates under the general NATO security procedures for industrial security, security clearances, storage and handling of classified material and management of classified items - working with the NATO Security Bureau to assure proper security management, and the implementation of security procedures.[35]

4. NAMSA's Major Functional Areas

Functionally, NAMSA divides its operations into four major areas: Procurement and Quality Assurance, Supply Support, Maintenance Management, and Technical Support.

a. Procurement and Quality Assurance

(1) Procurement Policy.

The main objectives of the procurement function are two-fold: (1) the consolidation of procurement requirements of member countries, and (2) the obtaining of procurement requirements by competitive methods. These objectives are designed to obtain the most favorable prices for goods and services in support of the mission requirement in the NAMSO charter to "maximize...the effectiveness of logistics support to NATO armed forces and to minimize the cost to NATO nations individually and collectively." Procurement actions are governed by NAMSO Board of Directors Policy Directive Nr. 251, as amended, 3 July 1973, "Policies to Govern NAMSA Procurement;" NAMSA Regulation 251-R-1, as amended 15 July 1975, "NAMSA Procurement Regulation"; and NAMSA Regulation 254-R-1, as amended, 15

---

[35] Carver and Walsworth, op. cit, pp. 140-1

January 1975, "Quality Assurance Regulation".[36] Throughout the entire procurement process, and in the course of the day-to-day operations, NAMSA maintains regular contact with procurement personnel of member countries in order to avail itself of their knowledge and experience and to assure currency and accuracy of the NAMSA source file.[37]

NAMSO's procurement policies have been oriented, as well, towards balancing competitive considerations with those of complimenting the individual European national logistics systems and industrial bases in their attempts to achieve greater self-sufficiency. This has involved policies of developing and utilizing to the maximum extent possible European industrial sources, of developing European licensees to produce U.S. equipment, and BOP considerations in balancing the award of contracts among member nations. A mechanism used to further these policies has been providing for a fairer distribution of contracts over the long-run by giving firms from "worse placed" nations (BOP-wise with regards to NAMSA, that is) the opportunity to revise their bids so as to make them competitive with the quotations received from firms of nations that have a favorable ratio of contracts received from NAMSA over orders placed with NAMSA. More generally, NAMSA limits the award of contracts to the industries of NATO member States.

[36] Ibid., p. 56.
[37] Ibid.

(2) Procurement Examples.

In support of Supply and Maintenance activities, NAMSA has to place contracts to obtain spare parts and services. Large economies are obtainable from the consolidation of requirements and a more effective competition. NAMSA: Facts and Figures cited the following example to illustrate the economies made possible by consolidation of orders: aircraft hydraulic assemblies ordered by one country. The quantity being 5 assemblies, a unit price of $148 was obtained. By consolidating orders from three additional countries, the unit price went down to $90.30 for a quantity of 50, then to $25 for an additional quantity of 165 and finally to $7.86 per assembly for a total quantity of 269.[38]

For international competitive bidding the general rule is that all qualified contractors from the various participating countries are given equal opportunities to submit offers. The main tool at the disposal of NAMSA is a large source file of 14,000 firms. This source file allows the Agency to avoid recourse to dealers by going directly to manufacturers, and to obtain, in general, a high degree of competition.[39] In some 80% of all cases this file has enabled contracts to be awarded after international competitive bidding.[40]

[38] NAMSA: Facts and Figures, op. cit., p. 18.

[39] Helex and Flume, op. cit., p. 39.

[40] The average administrative processing time between receipt of an order and the award of a contract was 97 calendar days for spare parts and 160 calendar days for maintenance.

A central inter-allied agency is naturally in a better position than national agencies to organize the broadest possible competition. Since equipment suppliers usually manufacture only a fraction of the spares themselves that constitute a given piece of equipment, for follow-on support, they put a high markup (up to 100% or more in general) on "bought-out" items. A good source file, therefore, indicates the real manufacturers of the spare parts, something which requires considerable cost and research, and, clearly, is not carried out economically when the same efforts are duplicated in several countries.

The following example was cited in NAMSA: Facts and Figures as illustrative of the economies rendered possible through competition, using a good source file:

Having to procure spare parts for the General Electric J79 engine (used on the F-104G Aircraft) for an amount totalling about DM 15 million, NAMSA made a comparison between prices offered by 3 "equipment suppliers" (the original engine manufacturer and two European licensees) and prices actually paid by NAMSA.[41] The results were the following:

[41] NAMSA: Facts and Figures, op. cit., p. 19.

	Number Of Line-Items In The Offer	Prices Offered By The Equipment Supplier	Prices Actually Paid By NAMSA	Average Mark-Up By The Equipment Supplier
	(a)	(b)	(c)	$\frac{(b) - (c)}{(c)}$
		DM	DM	
Firm No 1	1,233	7,177,373	4,777,737	49%
Firm No 2	1,242	12,108,825	7,497,286	61%
Firm No 3	88	7,688,471	2,901,643	165%

NAMSA also performs limited procurement tasks that are not in support of its supply and maintenance activities. These principally involve the procuring of equipment for various host countries that is financed by the NATO Infrastructure Program, but also some equipment for European NIKE and Hawk units.

(3) Procurement Practices and Procedures

The following summary of NAMSA procurement practices and procedures is taken from Carver and Walsworth, pp. 56-64.

NAMSO policy is to award contracts to the lowest bidders among NAMSO member countries, subject to the following conditions:

- European sources shall be used to the greatest extent possible to encourage development of European production.
- Balancing of production among NAMSO member countries is required. Procurement sources from "worse-placed" countries in terms of balance of payments will be included in sources for solicitation of bids, and contract award shall go to the "worse-placed" country when two bids are similar.

Additionally, if the lowest bid comes from a "well-placed" country, NAMSA shall give the next best offer from a "worse-placed" country an opportunity to match the low bid prior to contract award if the "worse-placed" bid is not more than ten percent higher than the low bid.

- Contracts will ordinarily not be placed with firms whose legal residence or main production facilities are located outside NAMSO member countries, (i.e., all NATO member countries except Iceland). In those "very exceptional circumstances" where such action is required, approval of the NAMSO Board of Directors, and, should the Board of Directors deem necessary, the North Atlantic Council, is required.
- The General Manager, NAMSA, may approve sole source contracts under $1,000, or its equivalent in other currencies, to non-NATO member countries, and contracts under $20,000 to NATO countries not members of NAMSO without approval of the Board of Directors. Under no circumstances will a contract be awarded to a Communist country.[42]

Sole source procurement is authorized:

- when the source is the only available supplier;
- if competitive procurement would delay customer declared emergency requirements beyond the acceptable date specified by the customer(s) requesting procurement;
- if an existing contract contains a valid option in effect less than one year, which is beneficial to NAMSA; or
- if the cost involved are very low, approximately $260 or less.[43]

[42]Carver and Walsworth, op. cit., pp. 56-7.
[43]Ibid., pp. 57-8.

Procurement from United States military sources under the FMS program is limited to:

- sole source circumstances;
- special types of equipment (e.g., cryptographic items and missiles);
- routine requisitions with a total value less than $500; and
- items for which no European source is known and for which no source can be developed within required delivery times.[44]

NAMSA maintains a file of sources in order to effect a wide distribution of proposals and properly identify supplies or services required, with the objective of achieving international competitive procurement on the largest possible scale. Each source must be certified by the NAMSO member country in which it is located as to its eligibility to conduct business with the member country's military logistics system. If an instance should arise where procurement is affected with a firm in a non-NAMSO country, the NAMSA General Manager, or his designee, will decide on the eligibility of the firm based on the best available information. Both private firms and Government owned facilities in NAMSO member countries are included in the source file. As of March 1976, the NAMSA source file contained some 20,000 firms and military sources.[45]

The normal procurement procedure is for NAMSA procurement activities to select from the source file the sources to be requested to submit competitive proposals. In "very exceptional circumstances" requests for proposals may be advertised. Under circumstances where a retailer is believed able to submit a competitive

[44] Ibid., p. 58.
[45] Ibid., pp. 58-9.

proposal, such sources will be considered, although manufacturers are usually selected to submit proposals. At least three sources will be selected from the source file. Solicitation will be limited to those sources which have sufficient capability and reliability, considering the specific procurement requirement and the magnitude of that requirement. Where a customer has indicated a desire that a particular source be included, NAMSA will comply so long as the customer request is not intended to direct particular requirements to particular sources in violation of NAMSA's competitive procurement objective. Where the number of sources permit, efforts shall be made to rotate solicitations in order to insure equitable distribution to all sources. However, if a particular source is consistently among the lowest respondents to solicitations, no such restrictions will apply. Additionally, the criteria of balancing production in terms of "best-placed" and "worse-placed" countries outlined above will be followed. Geographical dispersion of contractors is also required in order to avoid concentrating all of NAMSA's suppliers and servicing firms in one industrial area. For supplies and/or services which involve patent rights or proprietary manufacturing processes of U.S. firms, competition will be sought to the maximum extent possible from licenses located in European NAMSO member countries. If no licensee exists, NAMSA may investigate the possibility of establishing such a licensee, if they desire.[46]

Requests for proposals (RFPs) will be as accurate, detailed, and informative as possible. Each request shall be prepared in such a way that the resulting responses from the sources could constitute the basis for a binding and, if possible, fixed price contract, if accepted by NAMSA. Pre-award negotiations of

---

[46] Ibid., p. 59-60.

contractual terms are not encouraged and are accomplished only on an exception basis. Examples of exceptions are:

- when evaluating proposals for a service contract;
- when determining if a "worse-placed" country can match a low bid; and
- when all proposals received are considered unsatisfactory. Any type of pre-award negotiations must be approved by the Chief, NSC procurement activity, NAMSA.[47]

Prior to any contract award, NAMSA shall make a determination of the prospective contractor's capability, responsibility and financial stability. This information will be included in the source file for future use. A proposal will be evaluated not only for prices, but also for estimated transportation costs, delivery schedules, technical capability and any other factors which affect costs. Proposals are evaluated by a Contract Awards Committee, whose composition depends on the dollar value of the proposed contract. Criteria are as follows:

- for contracts of an estimated value not less than approximately $3,200 but not more than approximately $12,850 or the equivalent in other currency: the buyer and two staff members selected by the Contracting Branch Chief.
- for contracts between $12,850 and $128,500: the buyer, a representative of the NAMSA Program Manager requiring the contract's goods or services, and one staff member selected by the Branch Chief.
- for contracts in excess of $128,500: the Chief of the Procurement Activity, the Program Manager, or his representative, and one staff member of the Procurement Activity selected by the Chief. The buyer and a price analyst will provide required information and assistance.[48]

---

[47] Ibid., p. 60-1.
[48] Ibid., p. 61-2.

All proposals remain confidential during and after contract award. After an award is made, the successful bidder is notified, and unsuccessful bidders are informed that their proposal was not accepted. No reason for rejection is given. If the low bid is rejected for any reason, NAMSA notifies the member country wherein the firm is located, and proceeds with other qualified bidders. The country, however, may appeal the rejection to the Board of Directors. NAMSA contracts are of three types: (1) Formal, (2) Informal, and (3) Small Purchase.

A Formal contract is the normal instrument used. The Formal contract usually calls for a definite quantity of supplies and/or services, although it can be for indefinite quantities if follow-on requirements are anticipated. Formal contracts may also contain option clauses.[49]

An Informal contract may be in the form of a Purchase Order if the total value is approximately $12,850 or less, or a Letter contract for priority requirements where time constraints are critical. Letter contracts will be superseded by Formal contracts not more than six months from the date of the Letter contract or completion of forty percent of the contract delivery schedule, whichever occurs first.

Small Purchase procedures are designed to eliminate paper work and reduce administrative costs. These procedures may be used on contracts totaling less than approximately $1,300. Small Purchase procedures basically reduce the requirements of the solicitation process and provide for sole source procurement of

[49] Ibid., p. 62.

contract requirements less than $260. Small Purchase procedures may not be used when classified goods or services are involved, or when specifications are extremely complex or not readily available.[50]

NAMSA attempts to use standard contracts as frequently as possible, with emphasis on fixed price contracts. Cost reimbursement contracts and ceiling-price ("not to exceed") contracts may also be utilized. All contractual instruments obligating NAMSO for more than $128,500 will be reviewed for legal sufficiency prior to final signature. Signatory levels range from contracting Branch Chiefs through the NAMSA General Manager depending on contract value.

Contract administration by NAMSA is designed to assure that the contractual obligations of the contractor and NAMSA are fulfilled, and that NAMSA's rights under the terms of the contract are exercised lawfully and in the best interests of both NAMSA and its customers.[51]

(4) Quality Assurance

Quality Assurance though being a function closely administered by NAMSA, is actually provided by the government inspectors of the country in which the contractor's premises are located. This service is provided in conformity with the NATO Standardization Agreement (STANAG) 4107 at no cost to NAMSA (except, until as of very recently, in the U.S.A.).[52]

---

[50] Ibid., p. 63.

[51] Ibid., pp. 63-4.

[52] NAMSA: Facts and Figures, op. cit., p. 7.

NAMSA encourages standarized Quality Assurance procedures and policies, serves as advisor to the various member countries performing Quality Assurance services and provides appropriate Quality Assurance guidance. Contractors must agree to a six-month (or longer) warranty, and must also agree to accept NATO dispute procedures. NAMSA deals directly with the contractors in such matters.[53]

Quality Assurance of repair work performed in-house is the responsibility of NAMSA Quality Control Inspector.

b. Supply Support

The principal functions of NAMSA supply management are the provisioning of initial stocks and providing follow-on supply support for those systems assigned to it, while being assisted by member nations in minimizing the red tape involved in national customs formalities for NAMSA shipments. The seven main categories of spare parts supply support provided include:

(1) brokerage—the acquisition on a one item basis, of non-stocked, non- authorized items for NAMSA customers.[54]

(2) selecting and managing stocks—creation of a buffer between supliers and users so as to reduce lead-time to a minimum; and centrally stocking and managing those items or stocks that have a high unit cost and a low demand rate (e.g., insurance type items) at national depots, thereby allowing the quantities required to be reduced.[55]

[53] Carver and Walsworth, op. cit., p. 64.
[54] Carver and Walsworth, op, cit., pp 67-70.
[55] Ibid., pp. 70-89.

(3) excess and surplus stocks—ensuring the effective utilization, conservation and marketing of excess and surplus property among NAMSA and the member nations.[56]

(4) maintenance float—a pool of serviceable end items which usually require removal from the operating site for maintenance processing.[57]

(5) direct exchange—a component, assembly, or sub-assembly, stored and managed by NAMSA so as to be available for exchange for a like unserviceable item turned in for repair or overhaul.[58]

(6) redistribution of stocks, either in large supply or excess, from national depots to customer nations which have unfulfilled requests, or who continue to maintain a system phased out by another member country.[59]

(7) mutual emergency support for all systems that it supports, while making a distinction between peacetime, NATO alert, and wartime.[60]

c. Maintenance Management

With regard to maintenance management the NAMSO Charter states that NAMSA's function are "...to collect and analyze data on the accumulation of repairable

[56]Ibid., pp. 89-92.
[57]Ibid, pp. 92-96.
[58]Ibid., pp. 96-98.
[59]Ibid., pp. 98-100.
[60]Ibid., pp. 100-102.

material; to calculate future maintenance and overhaul requirements, including "pipeline" requirements; to determine and set up profitable joint repair; maintenance; and overhaul arrangements."

NAMSA has no general industrial shop capabilities, and as such the majority of maintenance services are contracted for by NAMSA to industry. This activity has a much wider scope and volume than in-house work. The first step for NAMSA is to obtain long term workload forecasts from customers for those tasks provided by NAMSA. The various requirements are then consolidated into multi-year maintenance plans. After technical specifications for the work to be done have been obtained or established, requests for proposals are sent out to a number of qualified firms of the participating countries. Once NAMSA has verified, through pre-award surveys, that the firms are technically and financially capable of undertaking the work, international competitive bidding leads to the most favorable offerors receiving the awards for the contracts. Once the contractual facility is ready to operate, NAMSA's main tasks are:

- manage the input/output of equipment;
- manage the modifications (if any) to be performed during the overhaul;
- manage the stocks of spare parts to be used in support of the repair/overhaul program;
- manage a system of exchange for end-items (Maintenance Float) and assemblies (Direct Exchange) which are put at the disposal of customers to replace their equipment while it is being overhauled.[61]

[61] Ibid., pp. 103-4.

The consolidation of the various participants' requirements for maintenance services also leads to important economies. According to NAMSA: Facts and Figures, a study of the NIKE overhaul program showed that if the 8 participating countries had operated separate programs, their investment costs would have been 70% higher, leading to an additional expenditure of $5.6 million. Furthermore, labor costs (which actually amounted to an average of about $3 million per year over 6 years) would have been 35% higher.[62]

An example provided of economies possible through centralization of repair work for equipment used in several nations was the establishment of a NAMSA LANCE/TOW workshop for depot level repair of electronic circuit boards and optical equipment. The investment required to build and equip that shop with special tools, test benches, spares, etc., amounted to some $11 million. Had the five LANCE and nine TOW user nations decided to repair their materiel individually, the investment to set up repair facilities in the various nations would have been more than $30 million.[63]

Those in-house services that are provided by NAMSA technicians and facilities include the following tasks: Calibration services for specific member nation test equipment; repair and recertification of calibration equipment; depot level repair and testing of electronic optical equipment for the Lance and Tow missile systems; repair of ACE—High communication equipment; and in-storage maintenance of material stocked in NAMSA's depots.

[62] NAMSA: Facts and Figures, op. cit., p. 18.
[63] Ibid.

d. Technical Support

In addition to the tasks of procurement, supply, and maintenance, there are several secondary tasks performed by NAMSA, which include: technical assistance and configuration management.

Technical assistance provided by NAMSA for supported systems is a centralized logistic support field growing in importance and includes such services as:[64] on-site assistance; technical publication; technical advice; monitoring of surveillance programs; the convening of support conferences; and codification and item identification;[65]

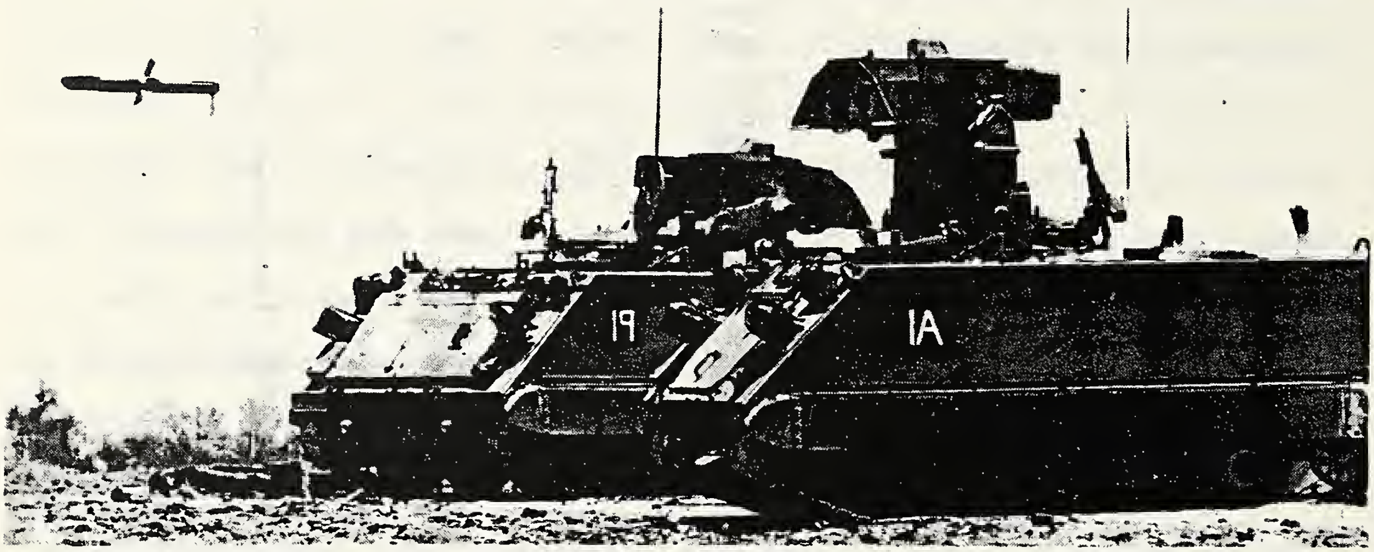
Configuration management covers failure data collection and analyses, technical studies, modification proposals, status accounting, and maintenance and updating of technical documentation.

e. Publications

In order to effectively perform these various procurement, supply, maintenance, and technical assistance services, NAMSA had to first develop certain standardized regulations and procedures which now govern the relations between customers (the national services, SHAPE, and other NATO agencies), contractors, and NAMSA.

[64] Ibid., p. 8.

[65] As for this last service, NAMSA can monitor the codification of spare parts for supported Weapon Systems, and does provide this service for all of NATO's sophisticated equipment contracts (the procurement of which was funded by the NATO Infrastructure Program). The codification itself is performed by the national codification bureaux; the role of NAMSA is to coordinate the codification efforts of the various contractors and national codification bureaux's involved, to collect the codification data, and disseminate it to its customers. NAMSA can also assist customers in providing complete identification by item, including logistic data, by researching its technical library.


19
IA

This was done through the publication of regulations and manuals to cover its activities in the major operational areas:

- the NAMSO Glossary of Terms;
- the NAMSA Procurement Regulations (251-R-1);
- the NAMSA Quality Assurance Regulations (254-R-1).
- the NAMSA Supply Manual (225-1);
- the NAMSA Maintenance Manual (235-1).[66]

f. <u>Tasks Performed by NAMSA for Each Weapon System</u>

For an idea of the mix of these services provided for each system supported by NAMSA see the chart on the following page.

5. Carver and Walsworth's Evaluation of NAMSO Performance

The following is a condensation of Carver and Walsworth's Chapter VI, "An Evaluation of NAMSO Performance," which evaluates the effectiveness, and efficiency of NAMSO in meeting its stated mission and objectives.

NAMSA makes four basic claims to substantiate the point that the member/customer needs are being satisfied:

---

[66] NAMSA: Facts and Figures, op. cit., p. 4.

TASKS PERFORMED BY NAMSA FOR EACH WEAPON SYSTEM

	SUPPLY STOCKAGE	SUPPLY BROKERAGE	IN-HOUSE MAINTENANCE	CONTRACT MAINTENANCE	MAINTENANCE FLOAT/DIRECT EXCHANGE	TECHNICAL SUPPORT
NIKE	*	*		*	*	*
HAWK	*	*		*	*	*
LANCE	*	*	*	*	*	*
TOW	*	*	*		*	*
SIDEWINDER	*	*		*		*
AIR DEFENSE RADAR	*	*		*	*	*
COMMUNICATIONS	*	*	*	*		*
F.104		*				
DRONE CL 89	*	*				
FH-70	*	*				
TORPEDOES		*		*		*
CRYPTO		*				

The following general support services are provided for all systems :

- codification and identification,
- procurement and quality assurance,
- transportation.

For a numoer of selected systems, technical assistance and training services are also provided.

SOURCF NAMSA - Facts and Figures

(1) in its 2 decades of existence it has achieved substantial economies for the NATO community.

(2) it has developed well tried regulations and procedures that are highly adaptable for solving the peculiar problems of international cooperation.

(3) its flexible organization and the use of the program management concept provides flexible policies allowing the tailoring of logistics support to the requirements of the customers.

(4) existing facilities and resources could be expanded easily to accommodate any new programs and responsibilities.[67]

Carver and Walsworth developed 8 overall goals against which the success of NAMSA in fulfilling its objectives could be evaluated:

- Increase the self-sufficiency of NAMSA member nations.
- Avoid political conflict.
- Standardize logistics support methods.
- No profit - no loss.
- Timely response to demands.
- Attract and maintain a competent and motivated workforce.
- Become the focal point for logistics information.

[67] Carver and Walsworth, op, cit., pp. 147-8.

- Continue to grow, and to expand logistics support.[68]

a. NAMSA has been successful, though not entirely so, in its promotion of the self sufficiency of individual member nations. NAMSA procurement policies of developing and using production sources within European NATO members to a maximum extent possible, and in particular developing European licensees to produce American manufactured equipment, have not been entirely successful since the majority of parts stocked and issued by NAMSA are still procured from U.S. sources.

On a second point however, the realization of economies of scale resulting from: (1) consolidating member countries supply and maintenance requirements; (2) centrally stocking high cost, seldom used insurance items, and; (3) providing a Maintenance Float—has reduced both initial investment and follow-on support costs for member countries.

A third area in which NAMSA has promoted self sufficiency was the provision of technical assistance services, especially to those member states who have yet to reach a high degree of industrial and technological capability.[69]

b. NAMSA, as a service organization charged with supporting commonly used weapon systems and equipment, as determined by member countries, has only succeeded in avoiding political conflict by not straying from its narrowly defined areas of activity. Its agressive pursuit of an expanded role has caused some customers to perceive it as a competitor with national interests, attempting to

---

[68] Ibid., pp. 150-151.
[69] Ibid., pp. 151-155.

duplicate tasks that are seen to be national responsibilities. This conflict stems from the inherent contradiction in the coexistence of the Alliance oriented principle of NATO Rationalization/Standardization/Interoperability (RSI), with the principle of logistics and defense procurement being a national responsibility.

In any case, member states recognize, as well, the advantages that NAMSA affords and actively strive to minimize political differences. Carver and Walsworth provide three examples to support their conclusion that, in spite of individual reservations, the member states generally work for the collective benefit of the organization. First, the NAMSO Board of Directors functions as an effective buffer between national political interests and NAMSA, resolving conflicts at the BOD level, and thus permitting NAMSA to concentrate on its logistics support duties and responsibilities. Secondly, effective communications and review channels exist between NAMSA and other NATO Organizations. Thirdly, Member States act to facilitate NAMSA operations by recommending potential contractor sources, by striving to eliminate "red tape" involved with national customs formalities, and by minimizing public criticism of NAMSA preferring to solve any problems internally (although privately, some Member States still have strong reservations over the use of NAMSA).[70]

c. NAMSA, as a proponent of the standardization of logistics support methods, encompassing both equipment and procedures, has contributed to the credibility of greater NATO standardization, even though implementation thereof is still

[70] Ibid, pp. 156-158.

dependent on customer acceptance. The economic advantages of consolidated procurement of common supply and maintenance requirements has been previously mentioned.

Although NAMSA's procedures are designed to standardize basic logistics support methods, in practice, NAMSA managed programs have to be tailor fitted for the participating nations, using only the basic logistics support procedures as guidelines.

Additionally, NAMSA has historically been a proponent of standardized item identification and cataloguing, as shown in its introduction of the Federal Stock Numbering (FSN) system to NATO. However, a 1975 proposal to assume the cataloguing responsibilities of the national codification bureaux did not attract any comment from NAMSA customers.

NAMSA also attempts to achieve standardization of its calibration procedures and technical standards with those of the Member States, but its calibration facilities were experiencing a decrease in their workload (as of the mid-1970's). NAMSA's calibration laboratory operates in accordance with U.S. Army calibration standards, being audited annually by U.S. Army personnel. Laboratory working methods follow the U.S. Army Technical Bulletin and the U.S. Air Force Technical Order systems.[71]

---

[71] Ibid., pp. 159-162.

d. NAMSA has successfully attained the required goal of no profit - no loss and is approaching total cost visibility by program. The operating procedures developed as a result of NAMSA's no profit - no loss goal appears to be relatively well accepted by its members. This is reflected in the cost-sharing formulae developed for the individual NAMSA managed programs by the program participants.

On the other hand, there has been some criticism from NAMSA customers over the various surcharges and service charges above the actual cost of the items and/or service provided, such as transportation, packaging and handling, personnel, and administration. The U.S. attitude (shared to some extent by other members) is, "why should we pay 20% more for an item we can obtain ourselves." However, while this may seem to be a valid criticism when viewing the problem microeconomically, NAMSA's charges are based on true "total cost visibility".

U.S. accounting procedures do not permit computation of such elements as personnel costs and transportation costs by individual program or weapon system. Quoting NAMSA's Director of Logistics, H.S. Spaulding: "The fact that NAMSA is often criticized for being too expensive is based upon our commercial type cost accounting system which makes each cent spent per weapon system visible i.e.,

NAMSA's cost are known per supported system unlike the costs of any other governmental authority such as Army or Air Force Material Commands which are unable to expose their costs in broad daylight. Their costs are included in national military budgets, and moreover, unlike NAMSA, which by its Charter has to prove that it is cost effective, these national commands have an institutional protection which keeps their so-called military economy in a merciful twilight. In

summary, people that say NAMSA is not cost effective are wrong because they are unable to compare our "visible" costs with the "invisible" cost of a comparable organization."[72]

Another problem encountered is that NAMSA can't undertake any new projects or capital investment unless member countries agree to fund it, and consequently the rapidity of the fulfillment of such requirements is dependant on any participating Member States' financial support and their willingness to wait until NAMSA develops a capability.[73]

e. On the point of timely response to demands, Carver and Walsworth concluded that NAMSA has provided timely response to programed supply and maintenance requirements and to customer inquiries. While the response to unprogramed nonrecurring demands is somewhat less timely, NAMSA has succeeded in developing effective tools to respond to unprogramed requirements for supported systems.

Two examples of the constraints on NAMSA's response to demands by member states are worthy of mention, especially since they are illustrative of the specificity of the Alliance's commonly perceived threat; the Soviet threat to the security of Western Europe. Alliance solidarity often quickly evaporates on peripheral issues where vital national interests are concerned, reenforcing the tendency of many of the members to emphasize independence over cooperation. The first example involved NAMSA's inability to respond to Turkish inquiries for increased

[72] Letter to the author, December 28, 1979.

[73] Carver and Walsworth, op. cit., pp. 162-164.

assistance, during the U.S. arms embargo against Turkey, following its invasion of Cyprus in 1974. The second one involved U.S. F-4 spares support to Israel during the Yom Kippur war. U.S. officials have privately expressed opinions that had NAMSA been responsible for support of U.S. F-4's based in Europe, direct spares support to Israel from NAMSA stocks would probably not have been possible due to international political problems generated by the conflict.

In any case Carver and Walsworth came to an overall positive evaluation of NAMSA's responsiveness by citing:

(1) Such NAMSA programs as, Brokerage, Mutual Emergency Support, Immediate and Emergency Maintenance requirements, the Maintenance Float, and Direct Exchange;

(2) NAMSA's basic stockage procedures;

(3) Its responsiveness to high priority/NORS requisitions;

(4) Recouping excesses from previous programs and redistributing them to present programs;

(5) The excellence of NAMSA's in-house capabilities and contracting-out in the performance of maintenance work (the majority being contracted to industry);

(6) NAMSA's procedures for responding to customer questions and requests for information and assistance;

(7) The traveling calibration teams (which unfortunately suffer from under utilization);

(8) The technical data provided NAMSA customers through Technical Information Bulletins and through the cataloguing and item identification files;

(9) Several miscellaneous items such as: NAMSA's flexible transportation system which allows for transporting items by the cheapest mode or the most direct mode, depending on the urgency of the requirement; the establishment of the Southern Depot so as to increase support to Italy, Greece, and Turkey; and NAMSA's upgrading of its EDP system.[74]

f. NAMSA has succeeded in attracting and maintaining a competent, and motivated work force, according to Carver and Walsworth. Their research supported findings of a U.S. Army team that evaluated NAMSA for possible support of Army Forces in Europe. The team concluded in February 1976, that "generally speaking, NAMSA personnel are hand picked, highly competent and totally dedicated to their organization."

Despite these capabilities, however, NAMSA's workforce does face a perception problem with its customers that decreases workforce effectiveness. Member

[74]Ibid., pp. 164-169.

States apparently perceive the organization as a "top-heavy and ponderous bureaucracy which is indifferent/insensitive to operational needs."

One other significant personnel problem involves the status of the NAMSA work-force during alert or war-time, there being no binding commitment on the part of Member States to leave their personnel with NAMSA during war-time or alert.[75]

g. NAMSA has been attempting to secure the responsibility of functioning as the focal point for logistics information. To date, technical bulletins have been a reliable source of information for NAMSA customers, while NAMSA's heavy dependence on U.S. development and engineering capabilities have constrained its configuration management efforts to a low level of activity.[76]

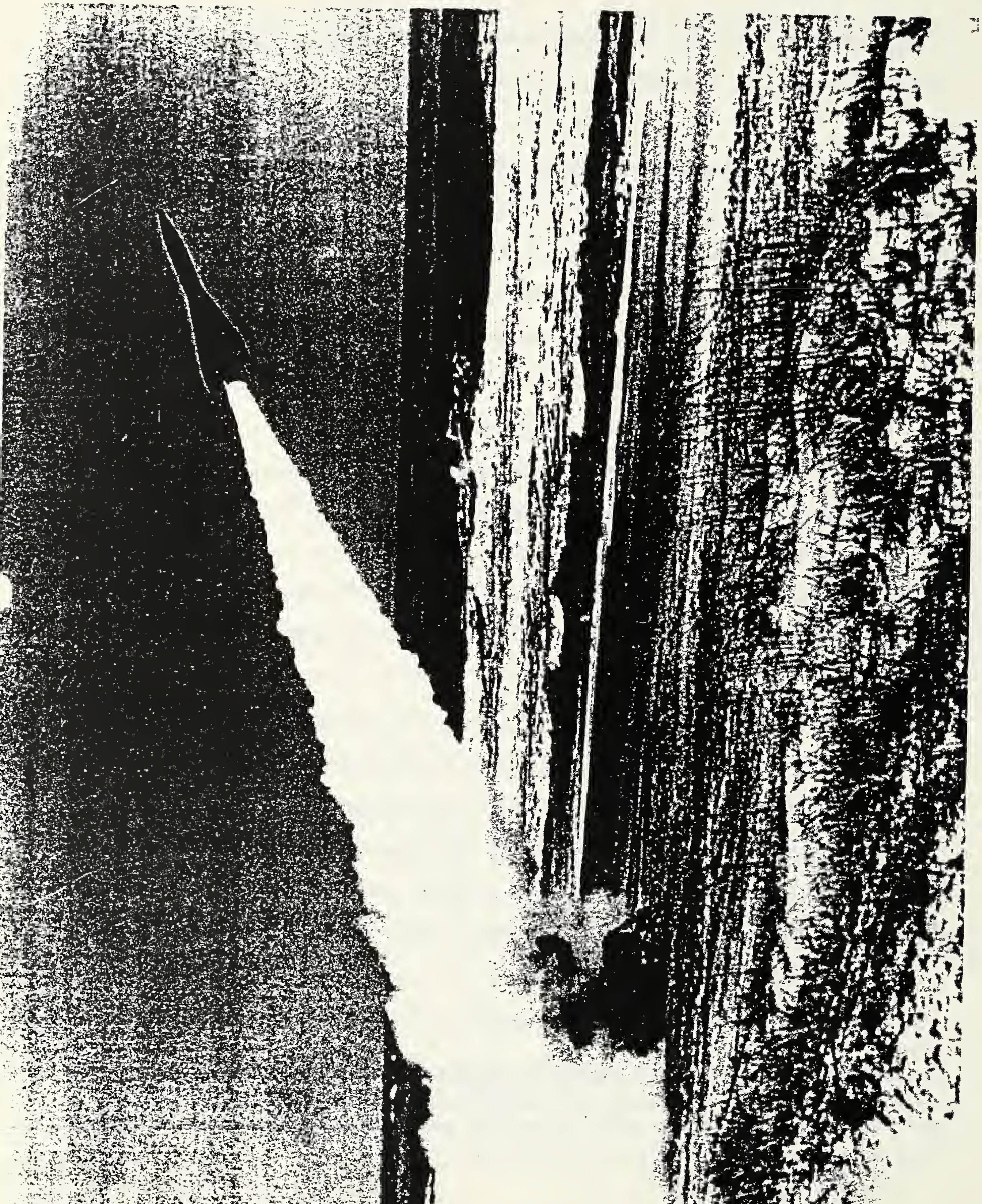
NAMSA's has historically promoted centralized cataloguing (in NATO terms, codification, having adopted the U.S. Federal Supply Class system) and accurate item identification, but these functions have continued to be accomplished by each Member State. NAMSA's primary responsibility is to compile the cataloguing and item identification data into a central file, and distribute the data to NAMSA customers. NAMSA had recently proposed that cataloguing functions in NATO be centralized within NAMSA in order to insure increased recognition of item commonality and item standardization, but as of March, 1976, no response to the proposal had been forthcoming from the Member States.[77]

---

[75]Ibid., pp. 169-172.

[76]Configuration management is defined by NAMSA as collection and evaluation of equipment failure data, planning for and acquiring modification sets and keeping modification records, and maintaining current technical files.

[77]Carver and Walsworth, op. cit., pp. 172-175.



h. One area that Carver and Walsworth felt NAMSA had not sufficiently probed, but in which NAMSA could make an important contribution to furthering NATO RSI, was the area of standardized logistics procedures.

In summing up, Carver and Walsworth felt NAMSA had undertaken an aggressive effort to expand logistics support, involving efforts to assume new weapon systems workload, the centralization of certain additional functions within NAMSA, and generally providing increased services to its customers. Nevertheless, NAMSA is still constrained by the philosophy of national logistics responsibility, (i.e., utilizing NAMSA only when absolutely necessary), Member States' perception of NAMSA, and NAMSA's dependence on participating countries to furnish capital investment funds, which all affect NAMSA's ability to expand its weapon's system support role. Although NAMSA works on the basis that standardized methods and centralized information will result in more effective support, the extent to which it can standardize and consolidate is determined by the Member States.[78]

6. NAMSA's Prospects as of 1980

There are a number of weapon and equipment systems which have been under review for a possible NAMSA support role. NAMSA project development activity for 1980 is as follows:

[78] Ibid., pp. 175-180.

1. <u>AEW&C (AWACS)</u>

- Planning future logistic support in cooperation with NAPMA (NATO AEW&C Program Management Agency).
- Execute transportation of material initially provisioned in the U.S., computerized due-in control, interim storage of material.

2. <u>SP-70 (Self-Propelled) Howitzer</u>

- Finalize logistic support plan to be submitted to NAMSO Board in November 1980.
- NAMSA's role: centralized supply from stocks, Mutual Emergency Support, procurement of spares, contractual repair, configuration management.

3. <u>MLRS (Multiple Launch Rocket System)</u>

- Exploratory discussions with nations may lead to logistic support plan.
- Role similar to SP-70.

4. <u>NAVAL LYNX (Helicopter)</u>

- Logistic support plan to be accepted during 1980 by nations.
- Role limited to central procurement of spares in support of national depots and common configuration management; centralized contractual repair of selected assemblies is not excluded.

5. <u>MAVERICK (Air-to-Ground Missile)</u>

- Exploratory discussions with nations may lead to logistic support plan.
- Role will be depot level maintenance of all missile assemblies.

6. <u>Oto Melara 76 mm Compact Gun</u>

- A feasibility study prepared in 1979 was to be discussed by the nations concerned in 1980.
- Role foreseen is centralized procurement of spares, central stockage of selected items and management of dispersed ammunition storage sites.

7. <u>TACAN (Tactical Air Navigation)</u>

Procurement of NATO Infrastructure Program funded TACAN stations and support role during O&S phase will be defined by SHAPE.

8. <u>Intrusion Detection System (IDS)</u>

Procurement of these NATO Infrastructure Program funded systems to protect nuclear warhead storage sites, and a support role during O&S phase, both to be defined by SHAPE.

9. <u>TORNADO (Multi Role Compact Aircraft)</u>

As per Board request, a feasibility study to identify areas of common support during the in-service life might be prepared during 1980.

10. PATRIOT

Exploratory discussions with the PATRIOT Management Office may lead to development of a special annex on joint logistics, such annex to be part of an MOU on joint system acquisition.

7. The U.S. and NATO's Long-Term Defense Plan (LTDP): Logistics

a. Logistics Within the Long-Term Defense Plan

Logistics is one of the ten areas singled out in NATO's Long-Term Defense Plan for improved allied cooperation within the framework provided by this plan. Since 1977 the allies have begun the implementation of wide range initiatives. Some of those which relate to logistics are listed below.[79]

- The establishment in 1979 of a new Assistant Secretary General for Infrastructure, Logistics and Council Operations plus a Director of Logistics on NATO's international staff;

- The establishment of the Senior NATO Logisticians Conference (SNLC) in 1978 to provide advice and policy on NATO consumer logistics matters (as contrasted to production logistics, which is handled by the Conference of National Armament Directors (CNAD)).
- Improvement of air, sea, and ground lines of communications (LOC's), along with host nation support of them;

[79]The DoD's annual report to the Congress on, "Rationalization/Standardization within NATO," provides an update on these initiatives along with a more detailed description.

- Negotiating technical agreements with allied nations for an increase in the number of colocated operating bases (COB's) for US based aircraft committed to Europe;

- Cooperative military airlift arrangements;

- Improving war reserve stocks of ammunition, fuel, and selected heavy equipment;

- Greater use of European industry for maintenance for the equipment of US forces stationed in Europe;

- Projects to establish forward area ordnance support facilities in the eastern Atlantic area to do minor maintenance, exchange components, and conduct ready for issue tests of modern sophisticated weapons;

- Increased capability for NATO forces to mutually provide replenishment at sea;

- Increased interoperability in the areas of (1) aircraft cross-servicing, (2) fuel standardization, (3) interchangeable ammunition, (4) greater use of private sector international industrial standards in NATO nations, and (5) the approval and implementation of Standardization Agreements (STANAG's) serving greater commonality of materiel and doctrine, along with operational, logistics and administrative procedures;

- the US/DoD's implementation of its Logistics Master Plan (LOGMAP) which in turn served as a guide in the development of the NATO Logistics Master Planning System (LOGMAPS);

- Enactment of laws by the US Congress allowing for the DoD's participation in, (1) reciprocal Quality Assurance, inspection and contract audit services, (2) mutual logistics support of allied forces in the field and (3) services provided by NAMSA.

The next section will elaborate on the latter two legislative developments.

b. U.S. Legal Impediments to NATO Mutual Logistics Support

The US has in the past made only limited use of NAMSA for logistics support of its forces in Europe. In part this is due to the US having had a full capability to support US forces in Europe. This, along with the broader world-wide logistics responsibilities of the US, has naturally influenced the choice of logistics support modes. However even in those cases where it would have been advantageous for US forces in Europe to work through NAMSA, or obtain logistics support from host nations, there were legal impediments.

These legal impediments have been at the center of a wider set of mutual support problems. Under the simulated wartime conditions involved in allied maneuvers the need arises for a great deal of mutual support in areas such as POL, servicing of equipment, transportation, rations, billeting, exercise ammunition and training. But this mutual support breaks down if every transaction must be

handled under the detailed procedures previously required by US law. Generally speaking, DoD procurement contracts with individual Alliance nations and NATO organizations for supplies and services to support US Forces have had to conform to the Armed Services Procurement Act, i.e. the same requirements of law as apply to DoD contracts with private firms. Likewise, any sales made to these nations and/or organizations have had to conform to the Arms Export Control Act.

NAMSA has not been willing to enter into contracts requiring full compliance with US procurement laws and regulations. The US has been the only NATO member state for which this has been a problem. All other NATO members contract with NAMSA in accordance with NAMSA regulations and procedures. Up to 1980, US Armed Forces could not legally contract with NAMSA. US use of NAMSA was always indirect through common funding, i.e. for support provided to NATO Infrastructure Program projects and follow-on operational requirements for many of these systems covered by the Military Budget.

These issues started to become more visible about 1976 when the US began, as part of the NATO RSI drive, to increase emphasis on host-nation support to improve interoperability and the readiness of its forces in Europe.

R. W. Komer, Undersecretary of Defense for Policy, appeared before two House Foreign Affairs Committee subcommittees in November, 1979, to testify on behalf of legislation to rectify these problems, the Mutual Support Act of 1979, HR5580. "We're simply hog-tied in the field. We lack the flexibility to give logistics support to our allies and receive it from them."[80] Komer further noted that US

[80] "Congress urged to help improve NATO Mutual Logistic Support," Aviation Week and Space Technology, Nov. 19, 1979, p. 22.

forces in Europe must operate at the end of a 3,000-mile logistic pipeline, periodically requiring short-term on-the-spot support that only a host or NATO member unit could provide.

Earlier DoD legislative proposals to improve the situation, however, had been unsuccessful. Congress had gotten the impression that the DoD was seeking the power to buy and sell initial order quantities of major equipment, on the spot.

The issue finaly came to a head in 1979. NATO dissatisfaction with "offensive" US contractual requirements had been mounting for some time, when in August the Dutch MoD announced it would not furnish logistic support under the current procedures, for the January, 1980 Reforger reinforcement exercise. Around the same time the Italian MoD refused to accept US provisions in an agreement for US use of the NATO POL pipeline system located in its territory.[81]

The requirements of US law are such that allied governments must be treated as private firms in the US purchase contracts for logistic support. Current restrictions are offensive to European Governments because Congressional restrictions, NATO members feel, insult them by ignoring their own various national safeguards against fraud and error.[82]

---

[81]One might recall that the Central European Operating Agency manages only that part of the NATO Infrastructure Program constructed POL system located in France, the FRG and the Benelux countries. The operation of the other parts of the system are managed on a national basis.

[82]"US-NATO: Logistics Cooperation" Defense and Foreign Affairs Daily, November 19, 1979, p. 22.

Lt. Gen. Arthur J. Gregg, Army deputy chief of staff for logistics who formerly held the same position with the army in Europe, testified before Congress in November, 1979, that the most glaring facet of this issue was the "officials-not-to-benefit" clause in contracts. "Our NATO allies object to the suggestion that their governments' officials may act improperly with officials of the US. Gregg also mentioned two other irksome clauses that served no purpose in a government-to-government process, (while conveying the impression that sovereignty was being violated). He also stated that the "contingency fees" clause prohibiting fee payments to middlemen who solicit contracts, was unnecessary in that there is no solicitation in the sort of agrements that would be affected by the proposed legislation. The other clause objected to in this context was one which dealt with gratituities to US personnel during consideration of contracts.[83]

DoD witnesses testifying in these hearings also expressed concern about support flowing in the opposite direction, i.e. the effect of the Arms Export Control Act which deals with the Foreign Military Sales program (FMS), on support provided by the US to European forces during NATO exercises. The FMS procedure suffers from being overly formal and time consuming. Transfers from US stocks are required, under FMS provisions, requiring a "cash-on-the-barrelhead" or advance payment. Komer stated:

> "There have been numerous instances in which US forces have been unable to give short-term local support to allied units during exercises because of FMS restrictions that require item-by-item" cash transactions".

[83]Congress Urged to Help Improve NATO Mutual Logistic Support," Aviation Week and Space Technology, Nov. 19, 1979, p. 22.

The legislation sought only concerned transfers of consumables and expendable supplies and the provision of services. Komer tried to reassure the legislators that the present law will not be gutted:

"The supplies transferred must come from the inventory of U.S. forces in Europe, and the inventory cannot be inflated to meet these special requirements...I can assure the subcommittee that the bill will have absolutely no effect on U.S. sales to NATO of weapons or major end items".[84]

Komer stressed that the provisions of the proposed legislation would apply only to 'consumables and expendables,' not major items of armament and equipment. "It's just what's in the inventory," Komer said.

"The emphasis is on services," he continued, "because that's what consumes manpower, and it's what the host nations are best equipped to provide. The materiel items—pol (fuel), clothing, ammunition and so forth—are required principally for exercises and for situations in which US or allied forces may find themselves temporarily cut off from their own sources."[85]

The one supply item most affected by the bill would be fuel, with spare parts taking the next largest share.

A final aspect of the bill's effect on foreign military sales relates to third-party transfers. The under secretary played down that politically sensitive factor by stressing that only services and minor material items such as a spare generator or a tank of jet fuel are comtemplated in the bill.

"Even where critical spares are involved," he said, "we think the risks of unwanted diversions to third parties are minimal because the quantities involved will simply be too small to be important."[86]

In order to solve these mutual logistic support problems the DoD introduced the following two legislative proposals in the 96th Congress.

---

[84] Ibid p. 23.

[85] Ibid p. 22.

[86] Ibid, p. 23.

8. Conclusions

Quoting from NAMSA: Facts and Figures:

> The highest Authorities in the Alliance have emphasized the need for wider and better logistic cooperation between the Forces of the various nations: NAMSO offers well-tried and proven means to achieve the desired progress. Its Board and Committees constitute excellent forums for consultation; and the Agency has shown a confirmed capability to carry out a wide variety of logistical tasks on a common basis.
>
> It must be emphasized that each participating nation retains the full control and responsibility for the logistic support of its own Forces. NAMSA provides only those services which each customer desires.
>
> Another useful role of NAMSA is that it acts as a receptacle of NATO experience: managing a variety of programmes, NAMSA can make lessons learned in any one of them, available to the whole community. Furthermore, NATO Production Organizations have temporary existence; when taking over from them, to insure the follow-on support, NAMSA also collects the experience gained by those Organizations in the field of logistics and can offer it to Organizations to be created later.

NAMSA has faced some problems, though. The only new weapon system among those jointly developed and/or produced in Europe since the late 60's for which participating nations have opted for support through NAMSA has been the Field Howitzer, FH-70. Herein lies NAMSA's current dilemma.

Although still feasible, those systems involving the multinational production of a system developed by one nation, as the Leopard I, the Mirage III/5, or the F-16, don't lend themselves as easily to being supported by NAMSA. For those jointly developed systems, where participation is on a more equal basis (e.g., Jaguar, Alphajet, Transall, Tornado, Milan), another problem is involved. Unfortunately, what inevitably happens is that logistics arrangements get locked in early in a joint development and/or production agreement with

HR5580, the NATO Mutual Support Act of 1979 (a revised version of DoD 96-4), was designed to solve the problem of mutual government-to-government support between the US and the NATO Allies. 'This proposed legislation would permit the US to negotiate agreements with NATO nations and NATO agencies such as the NATO Maintenance and Supply Agency (NAMSA) to cover the purchase, sale or load/exchange of certain supplies, services and minor equipment for mutual support of US and allied forces in Europe and its adjacent waters. This legislation would greatly enhance interoperability between Alliance forces, a major Alliance goal.'[87]

DoD Legislative Proposal 96-5 is intended to facilitate the making of agreements with friendly foreign governments in furtherance of the policies and directives concerning cooperation with NATO and other US Allies. It would make inapplicable to DoD purchases from other governments certain clauses required by law in US contracts. These clauses, which deal with the payment of gratuities, contingency fees for securing contracts and receipt of benefits by members of Congress, have been rejected by other governments as offensive and as imcompatible with the dignity of relations between soverign governments. The proposed bill is awaiting clearance by the Office of Management and Budget.[88]

The passage of these DoD proposals is expected to clear the way for greatly improved NATO mutual logistic support generally, while allowing, in particular, US forces stationed in Europe the option of tapping NAMSA services. Quoting NAMSA's Director of Logistics:

> As to the possibility for USAFE/USAREUR to use NAMSA we have had many discussions with U.S. representatives at all levels. The current situation is that the bill enabling use of NAMSA by U.S. Forces in Europe has been passed by the House of Representatives and has been approved by the Senate Armed Services Committee and is expected to be voted on during the second session of this Congress. In practice this means that hopefully as of early summer 1980 the legal basis will exist to allow e.g., repair by NAMSA of USAREUR TOW systems or USAFE MAVERICK electronics.[89]

The NATO Mutual Support Act of 1979 was passed and went into effect on August 4, 1980.[90]

---

[87]Department of Defense, Rationalization/Standardization within NATO, Sixth Report to the US Congress, January, 1980, p. 44.

[88]Ibid. p. 45.

[89]Letter to the author, December 28, 1979.

[90]A digest of this act is contained in the Appendix.

fixed production and sharing. As an example of what happens when a project is established on the basis of agreements which were tailored solely to bilateral interests, NAMSA's General Manager, Major General Gentsch, in a Military Technology interview, singled out the Franco-German Milan missile project. After being launched by France and the FRG, four additional NATO member states procured the Milan anti- tank missile, but the restrictions in the prior agreements have since impeded the implementation of a common logistics concept for the six nations.

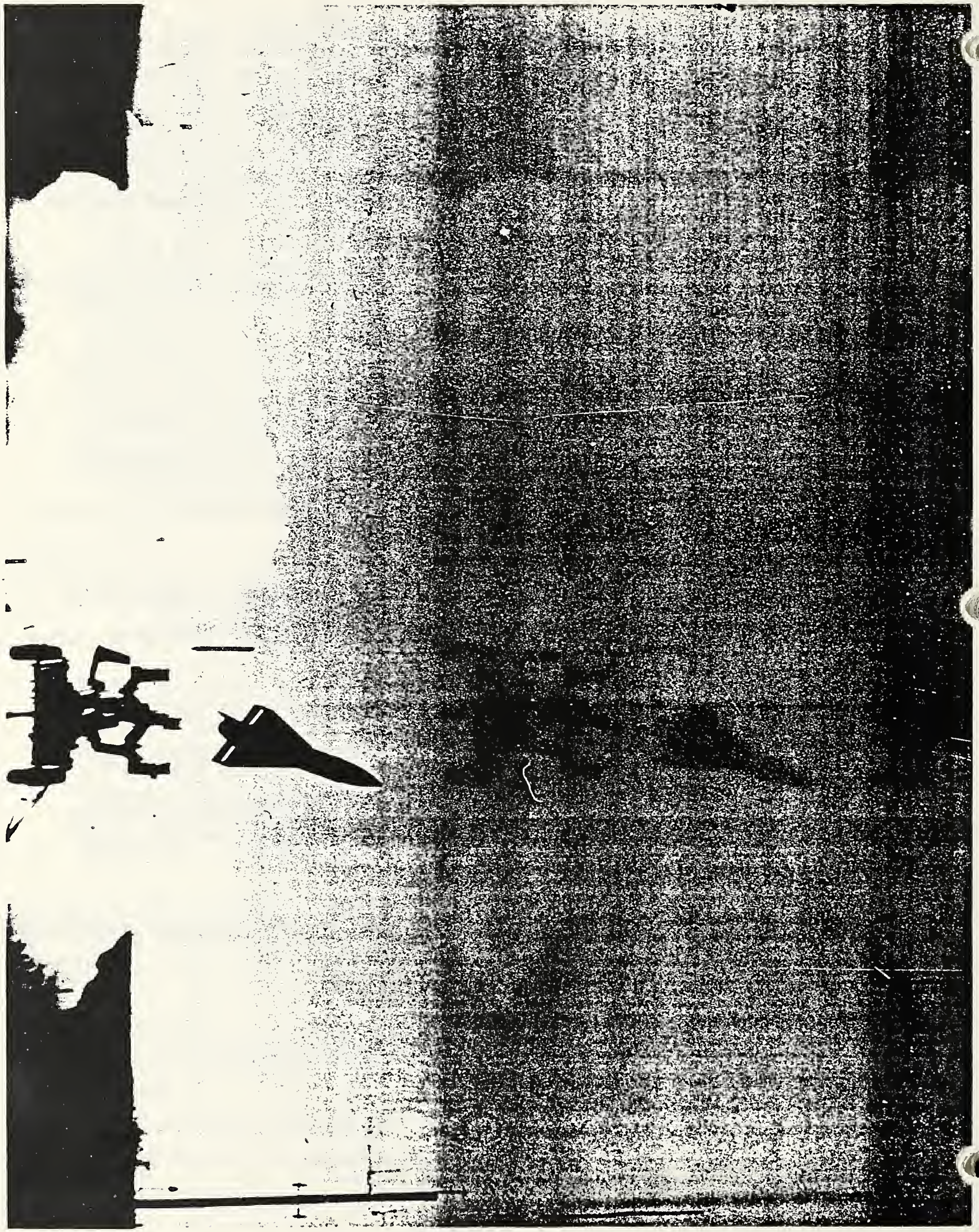
The following point emphasized by Spaulding, serves to remind us of the impact this problem has on cost for any given project, and more generally the weight that must be accorded to logistics in any NATO RSI drive.

> The ratio of $1 spent for R&D, $3 for production and $6 for logistics is more valid today than in the past, and any management errors or technical mistakes made during the R&D or production phase tend to have a multiplying effect on the $6.

Difficulties that have been faced by NAMSA in decisions on the feasibility of support on a joint and centralized basis were summarized as follows by Harold Helex and Wolfgang Flume in their Military Technology article, 3/77, entitled "NAMSA-The Wasted Opportunity:"

(1) Different configurations of weapon systems which are supposedly standardized;

(2) Differing national logistics concepts;



the same system, intending to support it—at least in part—on a common basis, and with common configuration control), it is essential that consideration of any potential support role for NAMSA for a system, be dealt with at the earliest possible stage of a project. Therefore, in the future, for each new weapon system which is to be codeveloped and/or coproduced, NAMSA should be requested to submit support proposals.

Ending on more of an up-beat note, the following quote is taken from the preface of the 1978/1979 NAMSA: Facts and Figures:

> The name of NAMSA is appearing more and more often in suggestions made by National and NATO authorities to improve international cooperation and cost-effectiveness in logistic activities. There are good grounds for considering that this trend will continue and that therefore NAMSA will be entrusted with further tasks. Thus, the role of NAMSA, as the principal logistics agency in NATO, is increasingly evolving into that of a nucleus for the expanding cooperation in logistics activity within the alliance.

---

[92] Carver and Walsworth, op. cit., p. 176.

the same system, intending to support it—at least in part—on a common basis, and with common configuration control), it is essential that consideration of any potential support role for NAMSA for a system, be dealt with at the earliest possible stage of a project. Therefore, in the future, for each new weapon system which is to be codeveloped and/or coproduced, NAMSA should be requested to submit support proposals.

Ending on more of an up-beat note, the following quote is taken from the preface of the 1978/1979 NAMSA: Facts and Figures:

> The name of NAMSA is appearing more and more often in suggestions made by National and NATO authorities to improve international cooperation and cost-effectiveness in logistic activities. There are good grounds for considering that this trend will continue and that therefore NAMSA will be entrusted with further tasks. Thus, the role of NAMSA, as the principal logistics agency in NATO, is increasingly evolving into that of a nucleus for the expanding cooperation in logistics activity within the alliance.

---

[92]Carver and Walsworth, op. cit., p. 176.

the same system, intending to support it—at least in part—on a common basis, and with common configuration control), it is essential that consideration of any potential support role for NAMSA for a system, be dealt with at the earliest possible stage of a project. Therefore, in the future, for each new weapon system which is to be codeveloped and/or coproduced, NAMSA should be requested to submit support proposals.

Ending on more of an up-beat note, the following quote is taken from the preface of the 1978/1979 NAMSA: Facts and Figures:

> The name of NAMSA is appearing more and more often in suggestions made by National and NATO authorities to improve international cooperation and cost-effectiveness in logistic activities. There are good grounds for considering that this trend will continue and that therefore NAMSA will be entrusted with further tasks. Thus, the role of NAMSA, as the principal logistics agency in NATO, is increasingly evolving into that of a nucleus for the expanding cooperation in logistics activity within the alliance.

[92] Carver and Walsworth, op. cit., p. 176.

interests inherent in weapon systems, has a much more certain future with NAMSA. In the foreseeable future there will also be a continued need for a regional supply, or at least maintenance system for certain systems of U.S. origin procured by several European nations (especially if there are no licensed European production sources for a given system, as with the NIKE, Lance and TOW missiles). In any event it will still take a considerable dose of political will to move beyond this limited, yet representative, scope of NAMSA activity.

To quote Mr. Stanley Beck, a former U.S. member of the NAMSO Board of Directors:

> Among the circumstances that hinder the reasonable expansion of the NAMSO mission are parochial reluctance on the part of those segments of national military services identified with a particular weapon system to permit any "outside activity" to be involved in any way—however cost-effective—with the support of that weapon system and vague unspecific criticism of NAMSA performance by factions, national or inter-national, more interested in creating and perpetuating their own empires than in ascertaining what services NAMSA can perform for the particular weapon system on a cost-effective basis.[92]

If RSI is to be more than just rhetoric, is not increased consideration of NAMSA's possible use a feasible area in which it can be implemented—as well as being a good litmus test of actual intentions? The more systems supported through NAMSA, as well as the more nations participating for each system, the more profitable is the utilization of the existing facilities and know-how, and the stronger NAMSA's position vis-a-vis industry. The more orders nations pass through NAMSA, the easier it is for the Agency to insure an efficient and fair distribution of contracts. If the basic prerequisites of a system being supported through NAMSA are fulfilled (i.e., several countries procuring

(3) Consideration of logistic aspects at a very late stage in the development of a project;

(4) Fixed distribution of production contracts and cost sharing among countries participating in a joint project;

(5) The existence of special organizations which were established for a newly- developed project, and which are, naturally, reluctant to transfer work to NAMSA;

(6) A general perception at the national and program level of NAMSA and multi-national agencies as a competitive threat, and therefore an agency to be resorted to only as a last resort, and;

(7) A general lack of knowledge at the national level on NAMSA and its activities.[91]

A major imbalance has existed in that the FRG has been the primary user of NAMSA, accounting for a third of NAMSA's support, while its industry has obtained a much smaller percentage back in contracts. On the other hand, the U.S: government has accounted for only 10% of NAMSA's support while U.S. industry has received 45% of the work. This imbalance is due, primarily to the FRG's, and more generally European, use of NAMSA having been almost exclusively for weapon systems of U.S. origin. This low share of work obtained by German industry was, however, up until recently, also due to German industry's having shown little interest in NAMSA contracts. Since the early and mid

[91] Helex and Flume, op. cit., p. 39.

'70's this attitude has changed considerably, reflecting the change in German industry's attitude

towards defense contracting generally—previously avoided due to its lower profitability. During the 70's German dependence on weapons systems of U.S. origin has been diminishing as well, with their replacement systems tending to be domestically or collaboratively developed. Which is, once again, an important part of the present dilemma faced by NAMSA.

The question then is, will NAMSA's support activities continue to be relegated primarily to the support of a limited number of weapon systems of U.S. origin plus those systems originally funded through the NATO Infrastructure Program? Or, will the U.S. government allow for greater use of NAMSA by U.S. forces in Europe and in U.S. dominated transatlantic programs (e.g., Seasparrow, F-16). And will the European governments allow its use for any of the proliferating European multinational development programs?

As of lately there appears to be hope for the future, now that the Alliance interest in coordinated logistics operations has been recognized in NATO's Long Term Defense Program (LTDP), wherein 'consumer' logistics is one of the ten major areas chosen for expedited improvement.

The perspective, as of early 1980, with the level of annual NATO Infrastructure Program expenditures approaching $1 billion, plus NATO's closely related $1.8 Billion procurement of 18 Boeing E-3A aircraft, would suggest that follow-on support for such Early Warning and C^3 systems, lacking much of the conflicting

(1) Different configurations of weapon systems which are supposedly standardized;

(2) Differing national logistics concepts;

(3) Consideration of logistic aspects at a very late stage in the development of a project;

(4) Fixed distribution of production contracts and cost sharing among countries participating in a joint project;

(5) The existence of special organizations which were established for a newly-developed project, and which are, naturally, reluctant to transfer work to NAMSA;

(6) A general perception at the national and program level of NAMSA and multi-national agencies as a competitive threat, and therefore an agency to be resorted to only as a last resort, and;

(7) A general lack of knowledge at the national level on NAMSA and its activities.[70]

A major imbalance has existed in that the FRG has been the primary user of NAMSA, accounting for a third of NAMSA's support, while its industry has obtained a much smaller percentage back in contracts. On the other hand, the U.S. government has

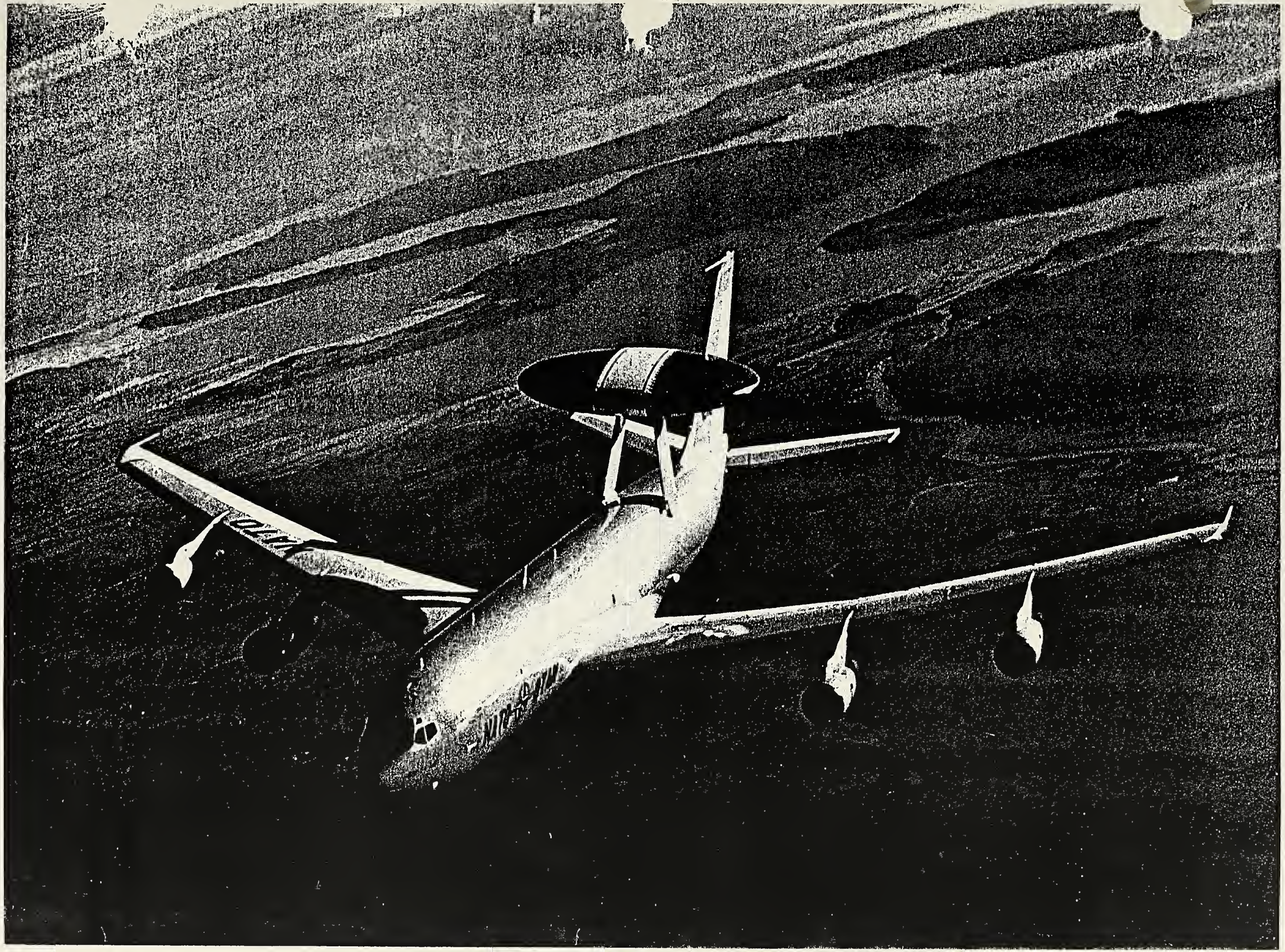
---

70 Helex and Flume, op. cit., p. 39

accounted for only 10% of NAMSA's support while U.S. industry has received 45% of the work. This imbalance is due, primarily to the FRG's, and more generally European, use of NAMSA having been almost exclusively for weapon systems of U.S. origin. This low share of work obtained by German industry was, however, up until recently, also due to German industry's having shown little interest in NAMSA contracts. During the early and mid '70's this attitude has changed considerably, reflecting the change in German industry's attitude towards defense contracting generally—previously avoided due to its lower profitability. During the 70's German dependence on weapons systems of U.S. origin has been diminishing as well, with their replacement systems tending to be domestically or collaboratively developed. Which is, once again, an important part of the present dilemma faced by NAMSA.

The question then is, will NAMSA's support activities continue to be relegated primarily to the support of a limited number of weapon systems of U.S. origin plus those systems originally funded through the NATO Infrastructure Program? Or, will the U.S. government allow for greater use of NAMSA by U.S. forces in Europe (previously minimal due to certain procedural and legal difficulties) and in U.S. dominated transatlantic programs (e.g., Seasparrow, F-16). And will the European governments allow its use for any of the proliferating European multinational development programs?

As of lately there appears to be hope for the future, now that the Alliance interest in coordinated logistics operations has been recognized in NATO's Long Term Defense Program (LTDP), wherein 'consumer' logistics is one of the ten major areas chosen for expedited improvement.



NATO E-3A

The perspective, as of early 1980, with the level of annual NATO Infrastructure Program expenditures approaching $1 billion, plus NATO's closely related $1.8 procurement of 18 Boeing E-3A aircraft, would suggest that follow-on support for such Early Warning and C^3 systems, lacking much of the conflicting interests inherent in weapon systems, has a much more certain future with NAMSA. In the foreseeable future there will also be a continued need for a regional supply, or at least maintenance system (if there are no licensed European production sources for a given system, as with the NIKE, Lance and TOW missiles) for certain systems of U.S. origin procured by several European nations. In any event it will still take a considerable dose of political will to move beyond this limited, yet representative, scope of NAMSA activity.

To quote Mr. Stanley Beck, a former U.S. member of the NAMSO Board of Directors:

> Among the circumstances that hinder the reasonable expansion of the NAMSO mission are parochial reluctance on the part of those segments of national military services identified with a particular weapon system to permit any "outside activity" to be involved in any way—however cost-effective—with the support of that weapon system and vague unspecific criticism of NAMSA performance by factions, national or inter-national, more interested in creating and perpetuating their own empires than in ascertaining what services NAMSA can perform for the particular weapon system on a cost-effective basis.[71]

If RSI is to be more than just rhetoric, is not increased consideration of NAMSA's possible use a feasible area in which it can be implemented—as well as being a good litmus test of actual intentions? The more systems supported through NAMSA, as well as the more nations participating for each system, the more profitable is the utilization of the existing facilities and know-how, and the stronger NAMSA's position vis-a-vis industry. The more orders nations pass through NAMSA, the easier it is for the Agency to insure an efficient and fair

[71] Carver and Walsworth, op. cit., p. 176

distribution of contracts. If the basic prerequisites of a system being supported through NAMSA are fulfilled (i.e., several countries procuring the same system, intending to support it—at least in part—on a common basis, and with common configuration control), it is essential that consideration of any potential support role for NAMSA for a system, be dealt with at the earliest possible stage of a project. Therefore, in the future, for each new weapon system which is to be codeveloped and/or coproduced, NAMSA should be requested to submit support proposals.

So as to end this on an up-beat note, the following quote is taken from the preface of the 1978/1979 NAMSA: Facts and Figures:

> The name of NAMSA is appearing more and more often in suggestions made by National and NATO authorities to improve international cooperation and cost-effectiveness in logistic activities. There are good grounds for considering that this trend will continue and that therefore NAMSA will be entrusted with further tasks. Thus, the role of NAMSA, as the principal logistics agency in NATO, is increasingly evolving into that of a nucleus for the expanding cooperation in logistics activity within the alliance.

Chapter 5

NATO AND INTERALLIED COLLABORATION IN RESEARCH, DEVELOPMENT AND PRODUCTION OF WEAPON SYSTEMS - THE INSTITUTIONAL DIMENSION

A. INTRODUCTION: THE THREE LINES OF DEVELOPMENT

Having covered those areas of the institutional dimension of NATO pertaining to Infrastructure (Chapters 2 and 3) and Logistics (Chapter 4), we are now ready to back into the most significant area of activity, weapon systems. Here though, institutionalization has not been able to advance nearly as far as in the areas of Infrastructure and Logistics.

There are three principal lines of development in weapons system collaboration within the North Atlantic Alliance. First, there was a succession of institutional reorganizations and initiatives during the first ten years that led up to the NBMR procedures and the Armaments Committee in 1959, and then ultimately to the more practical organization and procedures that have been in place since 1966 under the Conference of National Armament Directors (CNAD).

The early institutional developments were also closely interrelated with several key institutionally derived projects (NATO LWSR fighter, the Atlantic Maritime Patrol Aircraft, and NBMR3) that paved the way for (while also delineating the inherent limitations in the scope of their applicability) the explosion of ad hoc collaborative weapons projects starting in the late 50's and early 60's.

These ad hoc ventures represent the second, and most important, line of development. The ventures are classified into eight Modes, with NATO - i.e. the Organization -involved in any number of ways, or not at all. One of the Modes, involving a system being produced under license in one European nation, Mode #1, actually dates back to well before WWII. A second, Mode #4, is simply a later reversal of the transatlantic flow of Mode #1. A third Mode, #6, is in good part another modern variant of the barter approach to international commerce, while the remaining five Modes can be categorized as involving this late twentieth century phenomenon known as transnational enterprise. This dimension of NATO is explored in Part II, (Volumes 2 and 3) of this paper, where individual projects or ventures are grouped into the eight modes, each of which are treated in a separate chapter.

In addition, the first 15 years of the alliance were also marked by a third line of development involving an enormous infusion of North American military aid (tapering off in the late 50's and early 60's). Although this third line of development was very significant in its spurring of the other two, which are still with us today, this line itself has faded to insignificance. This line is, therefore, only treated briefly in this chapter to show how it is interrelated with the other two, which form the basis for the three dimensions explored in this paper.

This aid was through the Military Assistance Program (MAP) and primarily in kind (i.e., military equipment), but there was also a secondary aspect to it; its funding of development (MWDP) and production (OSP) in Europe itself. In addition to this, MAP was also contributing heavily to the allied defense effort through its high share in the NATO Infrastructure Program's common funding. The Mutual

Weapons Development Program (MWDP) funding involved the development of various subsystems as well as U.S. support for the first two NATO initiated weapon system projects; the LWSR fighter (G-91) and the Atlantic Maritime Patrol Aircraft (the first joint development of a major weapon system). Off-Shore Procurement (OSP) was initiated in 1953 bilaterally between the U.S. and other NATO nations. The recipients would produce aircraft with U.S. funding for delivery to itself or some other NATO nation.

This focus of OSP then shifted in the late 50's and early 60's to stimulating joint production in Europe of U.S. systems (the first joint production programs).[1]

Both license production and a predominance of equipment of North American (and to a lesser extent British) origin, allowed for a considerable degree of standardization in this early period. Since the early 1960's, however, the Alliance's industry/technological base has become much more diffuse. This still involves a considerable potential for standardization but not on an alliance-wide basis. Instead, there is the need for a double pronged approach based upon increased ad hoc collaboration where feasible, plus interoperability among this mix of jointly developed and/or produced systems.

B. NATO's INSTITUTIONAL DEVELOPMENT AND THE COORDINATION OF ARMAMENTS PRODUCTION

1. 1948-1956

A resume of the early history of collaborative production within the North Atlantic Alliance must deal primarily with a series of concepts, organizations, and procedures, that were tried out on an alliance wide basis. Three individual projects emenating from this early alliance-wide orientation are also dealt with in this chapter, but only to show the early lessons learned and set the groundwork for the looser and more successful project-by-project approach followed in Part II of this paper. In the words of Vandevanter: "The first decade of coordinated defense production can be described as a series of experimental efforts to find the organizational key to the puzzle; the first five years, in particular were consumed with attempts to perfect the techniques of centralized direction."[2] This was followed some five years later in 1959 by another burst of grandiose schemes which led to the establishment of a set of NATO procedures meant to funnel - and in practice force feed - the national military requirements into a NATO-wide system of collaboration. However, as we will see shortly, none of these schemes for implementing Article 2 of the North Atlantic Treaty during its first ten years ever amounted to much; the key sentence of which reads, "They will seek to eliminate the conflict in their international economic policies and will encourage economic collaboration between any or all of them."

a. NATO'S Military Production and Supply Board (1949-50) and Its Predecessors

In November 1949, the first NATO institution was established in the field of

defense production, the Military Production and Supply Board (MPSB), consisting of national delegates which met at frequent intervals in London.

The MPSB could trace its beginnings back to the Anglo-American collaboration in WWII. The activities of the various Anglo-American Combined Boards, the most relevant of which was the Combined Production and Resources Board, provided a precedent which carried over into the post-WWII era. The major aspects of the pattern of inter-governmental cooperation developed by the Combined Boards were fourfold;

(1) The international agencies should not displace national authorities, their purpose being to facilitate direct contacts between the responsible officials concerned;

(2) They should facilitate the exchange of information;

(3) They should enable participants to consult, to focus the issues involved, and to come to decisions;

(4) The recommendations made should be implemented by national agencies upon approval of the governments.[3]

This is generally how collaboration came to be worked out within NATO, but not without considerable travail.

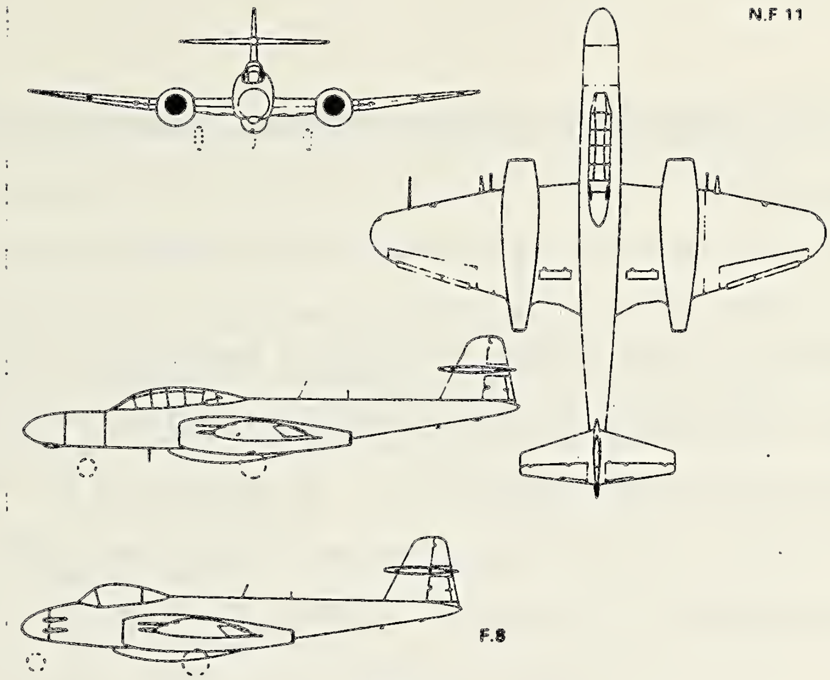
Much as the NATO Infrastructure Program had been originally launched under the auspices of the Western Union Defense Organization (WUDO), NATO's Military Pro-

duction and Supply Board had its immediate precursor under WUDO - the Western Union Supply Board. Set up in October, 1948, the Western Union Defense Organization included five member nations: France; the UK; and the three Benelux countries.

The primary function of both the Western Union Supply Board and NATO's Military Production and Supply Board was to recommend means of increasing production in fields where deficiencies were greatest. Quoting Lord Ismay, NATO's first Secretary General:

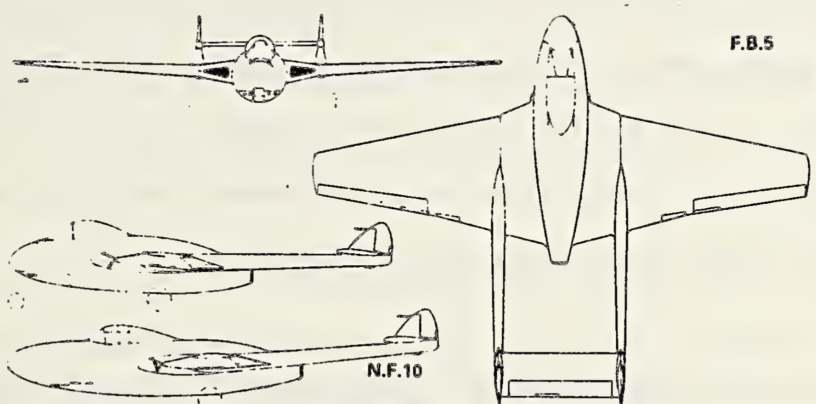
> For rather more than the first two years of NATO, the work of defense production planning was carried out under a committee system. The Military Production and Supply Board (MPSB), established in November 1949, was the first of these NATO committees. It closely resembled the former Western Union Board and worked in a similar way. The heads of national delegations to the MPSB met in committees at frequent intervals and each head of delegation made members of his staff available for ad hoc study groups. When highly technical studies were required, each delegate obtained qualified representatives from his country to serve on special sub-committees. This was the beginning of the system of 'groups of experts'......4

The Western Union provided an important stimulus for getting the continental European combat aircraft industry back on its feet again. Under a collateral Belguim-Dutch production effort, Belgium undertook to manufacture under license at Fabrique Nationale Rolls Royce Derwent jet engines, for installation in the 330 Gloster Meteor[5] aircraft that were to be built in the Netherlands by Fokker, also under license, between 1951 and 1954 for delivery to the two Air Forces (the Netherlands 300, and Belgium 30).[6] Furthermore, France undertook to build Vampire fighter-bombers[7] under license from de Havilland, to develop a fighter of her own design, and manufacture Rolls Royce Nene jet engines under license at Hispano-Suiza to power the Dassault Ouragan bomber[8] (the aircraft destined to replace the Vampires in the Armee de



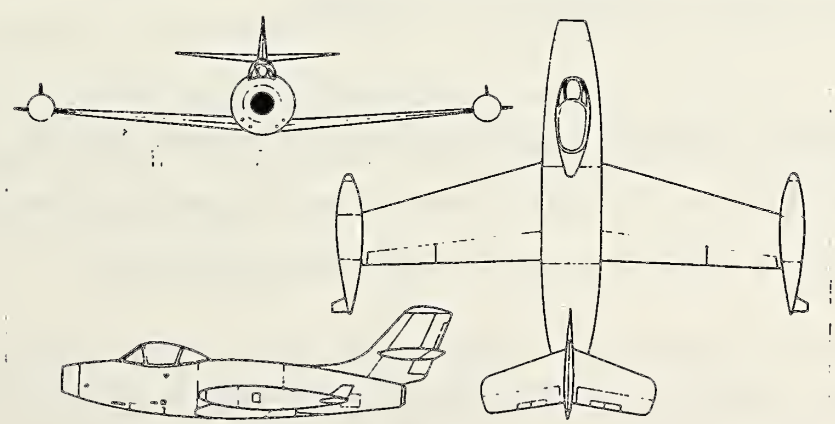
Meteor

Source: Rand McNally



Vampire

Source: Rand McNally



Ouragan

Source: Rand McNally

l'Air).[9] In the U.K., production of Meteors, Vampires, Canberras and jet engines was stepped up.[10]

The day-to-day operations of the Western Union Supply Board were carried out by a Supply Executive Committee which was in continuous session and which was served by the Western Union Supply Secretariat. The secretariat was made up solely of seconded persons since WUDO never had an international budget. This secretariat, alone among the civilian bodies in WUDO, was integrated into NATO, being carried over into the MPSB secretariat when it was organized a year later in November, 1949. Until July, 1951, when the international budget of NATO was instituted, the head of the MPSB secretariat (known as the permanent working staff (PWS)), and that of its successor, the DPB, wore two hats; those of MPSB and the Western Union Military Supply secretariats. After July 1951 the latter was allowed to go out of existence along with the Western Union Supply Board, though never formally dissolved.[11]

Therefore, closely resembling the Western Union Supply Board, the North Atlantic MPSB was set up under the Defense Committee in accordance with a decision of the Council rendered on September 17, 1949. The Defense Committee issued the following terms of reference to the MPSB:

(1) The North Atlantic Military Production and Supply Board shall be composed of a representative at the sub-ministerial level from each signatory country. It shall report directly to the Defense Committee.

(2) The Board shall establish and maintain close working relations with the appropriate military bodies set up under the Defense Committee. It shall

look to them for information on military requirements and work to insure that, insofar as feasible, the military production and procurement program supports defense plans effectively. The Board shall also work in close coordination with the military bodies on the promotion of standardization of parts and end products of military equipment, and provide them with technical advice on the production and development of new or improved weapons. To facilitate the fullest cooperation and exchange of information between them on matters of joint interest, the Board shall establish and direct a suitable representative liaison group on a working level in Washington to work with the Standing Group.

(3) The Board shall maintain close working relations with the finance and economic machinery to be established by the Council, and look to it for guidance on all relevant economic and financial factors.

(4) The North Atlantic Military Production and Supply Board is responsible to the Defense Committee for the performance of the following functions, having regard for the principle of self-help and mutual aid in the field of military production and supply.

(a) The review of the military supply situation on the basis of data to be secured from the appropriate military bodies on military material requirements and on the current availability of military material to meet such requirements.

(b) The recommendations to the Defense Committee of ways and means of increasing available supplies where they fall short of requirements,

either from production, surplus equipment or equipment economically capable of rehabilitation. In preparing such recommendations, account shall be taken of strategic factors, of physical capabilities of individual countries to produce military material, of the importance of securing maximum efficiency and integration of production, and of the guidance furnished by the finance and economic machinery with respect to financial and economic considerations.

(c) The promotion of more efficient methods of producing military equipment and of the standardization of parts and end products of military equipment, including conservation in the use of strategic and critical materials, and including advice to the appropriate military bodies on the production problems involved in proposed new weapons or modifications in existing weapons.

(5) The board shall provide itself with such subordinate bodies and staff assistance as may be necessary to carry out its functions. In particular, there shall be, in addition to the liaison group in Washington, referred to in paragraph 2, a permanent working staff in London, composed of qualified personnel representing interested countries, to carry on the day-to-day work of the Board. The Board shall have a secretary, with suitable assistance, to perform secretarial administrative functions.[12]

At its July 12, 1950 meeting in Copenhagen, the MPSB agreed that nine task forces would be established, to be assisted by the PWS. These task forces would be composed of senior production experts from member countries who would visit the producing countries to confer with the national authorities and to examine

facililties. This was in order to draw up a series of objective reports in which recommendations would be made as to means of increasing production in the fields where the deficiencies were greatest. The task forces were to base their inspections upon military requirements data given them by the Standing Group, and would take into consideration such factors as unit cost and production timelag.[13]

But the MPSB met only periodically, and it was soon discovered,

> ...that this committee system did not permit sufficient continuity, a proper division of labour, or effective forward planning. Delegations had to represent not only their own national point of view but also an impartial corporate international point of view. The duality of their functions meant that collective recommendations might not always be entirely objective.[14]

b. <u>NATO'S Coordinator of Defense Production (1951-52)</u>

Consequently, in December 1950, the MPSB was dissolved and replaced by the Defense Production Board (DPB). The earlier committee system was strengthened in two ways. First, arrangements were made so as to ensure that the heads of delegations to the DPB would be continuously available for meetings in London. Secondly, an international staff was created under Mr. W. R. Herod (USA) who was a member of the Board and had the title of Coordinator of Defense Production. Shortly thereafter, in early 1951, a Military Agency for Standardization was also established on the military side of NATO, in London, under the Standing Group,[15] to promote the standardization of operational and administrative practices and war materials.[16]

Mr. Herod, an American industrialist who was appointed Coordinator of Defense Production, was given the rank of Minister and was authorized to approach governments directly. The Financial Times reported in December 1950, that "Mr. Dean Acheson, U.S. Secretary of State envisages the appointment as Chairman of the (Defense Production) Board, of a production specialist with powers in the economic field parallel to the military powers of General Eisenhower."[17] That is to say, a supranational directorate for allied defense production.

The DPB's major achievement was to continue the process initiated by the MPSB of gathering information and issuing the reports drawn up by the nine task forces. These reports covered artillery and infantry support weapons, tanks, transport vehicles, engineering equipment, escort vessels and minesweepers, and recommended production additional to that already planned by the countries themselves. But this achievement fell far short of what Mr. Herod had been led to expect of his office and organization.[18]

Mr. Herod had strongly favored the establishment of a common defense budget for NATO, which would have resulted in the common funding of defense production. This course was discussed at length during 1951 and 1952, but was never adopted. Instead, the Annual Review system was developed which involved only coordination in the drawing-up of each member nation's defense budget. The Annual Review was an assessment made entirely on national lines, with no hint of supranationality.[19]

"Apparently Mr. Herod, believed that he would have strong executive authority to coordinate the placing of production orders among the various countries,

the allocation of deliveries, and the development of a system of common funding to pay for these orders."[20] Mr. Herod resigned in November 1951, quitting ten months after taking office, reportedly due to disillusionment.

The Chief-of-Staff to the Coordinator of Defense Production, who subsequently became the chief executive officer for the DPB after the Coordinator's resignation in November 1951 and assumed the same position in the DPB's successor organization as Deputy Assistant Secretary-General for Production and Logistics (PL), said, at the time of his departure in September 1952:

> The lessons of the past give clear indication that in present circumstances the functions of the NATO Production agency should be advisory rather than of an executive character. Where executive action is needed it should be fulfilled through Council action. Executive production powers should not reside in the PL division, and much less in individual sections save insofar as power and authority have already been specifically entrusted by the NATO countries,21 as in the case of infrastructure.22

Following this second round of high expectations followed by disillusionment, Lord Ismay, NATO's first Secretary General (1952-1957), had also come to the realization that those collaborative production activities that were feasible would have to be handled exclusively by the national delegations, using the International Staff/Secretariat only in a purely support capacity.[23]

c. <u>The Establishment of the Production and Logistics Division of the International Staff/Secretariat in 1952</u>

By late 1951, it had become apparent to the disabused that defense production in NATO would have to be geared more to the realities of the international environment. With the gradual realization that the DPB and its Coordinator had been

saddled with an unfulfillable task, and as plans were drawn up for a reorganization of the civil side of NATO, it was recommended that the activities of the DPB be assumed by creating a Production and Logistics (PL) Division in the newly forming NATO International Staff/Secretariat.[24] This was accomplished in early 1952.

Under the newly created post of Assistant Secretary General for Production and Logistics, the Division continued the activities of the earlier production agencies, profiting by their experience. In the words of Lord Ismay, "The aim is to use available resources to the best possible advantage by correlating the production programmes of the member countries multilaterally at the planning stage."[25] The activities of the Production Division fall into three main parts:

(1) long-term production planning;

(2) acting as the expert broker for the exchange of information, and guiding technical studies;

(3) participating in the Annual Review, which involves analysis of equipment requirements and resources for current and future years.[26]

The Production and Logistics Division of the International Staff/Secretariat was originally composed of ten Technical Sections; review and liaison, production coordination, aircraft, ammunition, vehicles, shipbuilding, armament, electronics, infrastructure, and spare parts coordination. By 1956, the number of Technical Sections was reduced to four; aircraft, ammunition, electronics engineering, and spare parts coordination.[27]

The Aircraft Section participated in the initial phases of placing U.S. Off Shore Procurement (OSP) contracts in Europe.

> One of the biggest steps toward furthering the build-up of European capacity through OSP was the placing of orders for aircraft. The Aircraft Section of the Production Branch played a useful part in this. The International Staff/Secretariat had its first opportunity to promote the co-ordinated production of aircraft in June 1952 when the United States announced that, if a sound plan could be devised for European aircraft production, it would be willing to place OSP contracts to help the cause of co-ordination. The International Staff/Secretariat made a study of the situation and recommended that military aircraft be produced in Belgium France, Italy, The Netherlands and the United Kingdom. With the International Staff/Secretariat's report as a starter, the countries concerned engaged in bilateral negotiations with the Unites States (and here the system lost its 'co-ordinative character') which culminated some ten months later in the signing of contracts worth some $550,000,000.28

The U.S. provided about half this sum and the production of aircraft of U.S., British, and French design was begun in Britain, France, the Netherlands, Belgium, and Italy for delivery to the armed forces of all NATO member states.[29] See Sub-Chapter D, later in this chapter for more detail on these projects.

In 1953 the Infrastructure Section became the separate Infrastructure Branch under the PL Division, due to this activity's having expanded to a very large proportion of the Division's work.

Between 1958-1960, the tasks of the Spare Parts Coordination Section were spun off to the semi-autonomous NATO Maintenance and Supply Service Agency (NMSSA, later redesignated NAMSA).

The Review and Liaison Section became the General Section of the Division responsible for the political, economic and administrative aspects of the work,

including the coordination of the work on problems affecting more than one Technical Section.

The Ammunition Section of the Production Branch and its corresponding Group of Experts on New Ammunition Manufacturing Techniques played a major part in the development of new ammunition; the components of ammunition; new techniques; new methods of packaging ammunition; and anti-gas equipment.

The Ammunition Section also did important work in handling the testing and specifications made necessary by the decision to adopt a standard round for rifles and machine guns. It was not intended that all NATO countries use the same rifle, but at least they could fire the same bullet. In 1945 the four major rifle calibers had been the French 7.5 mm., the American 7.62 mm., the British .303 cal., and the German 7.92 mm. By September 1951, following independent national studies, the United States, Britain, France, Canada, and Belgium agreed on the main military characteristics for interchangeable ammunition for a standard infantry weapon. In December, 1953, the Council endorsed the choice of the five nations,[30] the 7.62 mm. cartridge, as the NATO Common Round.[31] At the end of 1954 the five signed an agreement in Ottawa standardizing on the 7.62 mm.[32]

Common range facilities for testing weapons and ammunition were also set up. The Ammunition Section of the Branch was the clearing-house for the Centers and the repository for the test records.[33]

Though there had originally been much more grandiose plans, as it was to turn out, most of the weight of the dovetailed NATO and U.S. efforts during the early and mid-50's, to cover production deficiencies was to fall on ammunition and

spare parts production capabilities (i.e. items of high consumption) in Europe, since so much of the equipment itself was provided directly from North America.[34] With regards to assumptions as to the total scope of activities of the Production and Logistics Division during this period, and the corresponding groups of experts, Vandevanter summarized as follows:

> Here again, most observers presumed that the international organization would exercise centralized control of an integrated production program. National representatives, to be known as a "Group of Experts," were to be appointed for each project, in order to contribute national views and work the troublesome technical details.35

d. <u>Groups of Experts and the Establishment of the Defense Production Committee in 1954</u>

As with the Western Union Supply Board before it, the exchange of technical information, the gathering together of statistics, and the coordination of national defense production programs was accomplished largely through the use of 'groups of experts.' The groups, many of which had been formed under the MPSB and the DPB, and which comprised national technical representatives, were served for secretarial purposes by individual officers of the Technical Sections of the Production Branch.[36]

That is to say each Group of Experts was attached, for the provision of the various facilities necessary for the execution of its work, to the appropriate technical section of the Production and Logistics Division.[37]

The groups of experts were the focal point for 'doing business' in the Production Branch. The convening of persons of specialized skills and/or experience to per-form a specific task and then disband, had long been recognized as a useful practice in conducting international affairs. The

Combined Boards in World War II had constantly done this. Experts were brought together to dispose of an intransigent administrative or technical problem, to conduct preliminary negotiations before passing a matter on to higher bodies, to serve as the receptacle or a problem found irreconcilable at a higher level, or to exchange information.[38] When national defense policies are involved, however, many types of private and public interests can be brought to bear on a question. For this reason one of the major problems of the Production Branch was to see that the groups of experts were created and used effectively. The members of Groups of Experts created by any of the Committees of the Council remained national representatives and acted within the framework of the directions given by their own governments. These experts had no international status and were paid by their respective governments.[39]

It had been originally expected that the work of the various Groups of Experts engaged in production activities could be suitably controlled by having them operate under the rubric of the Production Branch, using the research and statistical facilities of the Branch's Technical Sections, and being dependent upon its secretariat service. Within two years after the creation of the Production and Logistics Division however, it had become necessary to consider measures for tightening up the Council's control over the groups.[40]

> This attempt to combine international and national administration ran into many of the same difficulties as its predecessors. The responsibility for implementing a project still rested with the nations, but the only national spokesmen in the apparatus, the delegates to the Group of Experts for the project, were primarily technicians, with little comprehension of national political or commercial policy, who sometimes embarrassed their national authorities by agreements they concluded at the working level. Policy guidance and decisions were furnished by International Staff members, who had no power to implement their recommendations. As time went on, these international authorities were increasingly discouraged by the individual allies' failure to follow up even the meager programs agreed to by the experts and recommended by the

> International Staff. The nations for their part were leery of being embarrassed by "international" recommendations, which conflicted with their economic or other interests but to which they were to some extent committed by the acquiescence of their scientists and engineers at the working level.[41]

On 12 February, 1954, it was suggested that a permanent high-level directing committee composed of policy spokesman from each nation should be established for this purpose.

At its Ministerial meeting in April, 1954, the Council approved the terms of reference for the new committee, to be called the Defense Production Committee (DPC). The Committee, chaired by the Assistant Secretary-General for Production and Logistics, and composed of the defense production advisors from the delegations, was authorized to serve as the general advisory body to the Council on all defense production questions. It was also given authority to appoint groups of experts, to fix their terms of reference, and to forward the reports of the groups of experts, together with its own recommendations, to the Council.[42]

In its first report to the Council in October, 1954, the DPC dealt with such questions as the maintenance of equipment of North American origin, the preservation of an industrial base for war-time production in the member countries, and the development of advance plans for industrial mobilization. The main emphasis however, was on supervision of the groups of experts.[43] Again, the expectations attending the setup of the new organization were not fulfilled. The system was still bogged down at the working group level. Instructions to the Groups of Experts contained in the official NATO pamphlet were to: "...primarily give consideration to the technical aspects of the problem rather than to the national preferences of their individual

countries...", while the individuals composing them were to "...keep in mind, as a secondary consideration, their countries' preferences, since in the final analysis, it will be essential to approve the solution before it can be made effective."[44] The dilemma that faced working-level personnel was therefore, in drafting technical specifications, he would have to work to define the 'best' weapon for NATO as a whole while being expected to satisfy his home authorities. As one might suspect, the interests of the alliance did not coincide with those of all of the nations enough to allow individual programs to work.[45]

The eventual acceptance of the impossibility of authoritative international direction was expressed in the following excerpt from a speech made in October, 1956 by Mr. J. Murray Mitchell, the second Assistant Secretary for Production and Logistics:

> Although one might jump to the conclusion that the way to organize the defense production side of an Alliance is (1) to draw up an agreed list of all the defense items required, and (2) then work out a production program allocating everything, from the construction of so many battleships right down to the supply of so many rounds of small arms ammunition to various countries according to their capacity and resources, such a way is not open to NATO by its very constitution. Each country is responsible for the establishment, execution, and financial arrangements pertinent to its own production or procurement program for its own forces.
>
> I have stressed this so much because ideas were put forward in the early days of the Alliance for a large-scale program of NATO-European production on a multilateral basis. These ideas, though attractive intellectually, foundered in practice on such reefs as national desires to favor home industry, difficulties in finding the money when finances remain a national responsibility, differing stages of national, economic and industrial progress, security factors, and so on.46

Whereas Murray's predecessor in the post had concluded an alliance-wide staff organization such as the Defense Production Board could not assume an

executive character, experience during his tenure brought Murray to broaden the frame of reference of this conclusion to include an organization which was based on groupings of national representatives working toward a common solution to equipment requirements, with or without a high-level cap-stone committee and/or director coordinating their efforts and reconciling them with purely national considerations.

In spite of this, there was one particularly vexing problem area involving the 'groups of experts' where progress was made during this period. This concerned the issue of whether, and under what conditions, industrial represen- tatives should be allowed into meetings, due to the sensitivity of information exchanged about production plans.[47]

In December, 1956, the DPC approved a draft statement submitted by the Working Group on the Protection of Proprietary Technical Information providing general guidance to the groups. This statement, together with the restrictions placed upon the presence of industrial representatives, helped to ensure confidence in the integrity of the work of the groups of experts.[48]

Another security related issue that had been set to rest the previous year, in 1955, was the North Atlantic Council's approving a finalized set of NATO Security Regulations, <u>C-M(55)15 (Final)</u>, which applied to personnel and the safeguarding of the exchange/export of classified information and material. <u>C-M(55)15 (Final)</u> has since applied to all such activity involving the NATO organization, subsidiary agencies, procedures and programs.

e. View From the Mid-50's

The cyclical evolution of the institutional arrangements between 1949 and 1954, showing how decision-making control had begun and ended with the dominance of national delegates, was summarized by Vandevanter.

> By the mid-1950's... NATO nations were greatly disillusioned about the future of coordinated defense production. The organizational structure had progressed through the following stages: 1) a very loose collection of individual, uncoordinated, national representatives (the Military Production and Supply Board); 2) a presumably powerful, but actually relatively impotent, Coordinator for Defense Production; 3) a prestigious but still powerless Assistant Secretary General for Production and Logistics of the International Staff aided by national delegations of technical assistants; and 4) a subministerial Defense Production Committee reminiscent in structure of the original Military Production and Supply Board. Thus, after much experimentation, final authority was once again in the hands of a committee of national representatives.49

"The system as developed by the end of 1954, with the Defense Production Committee sitting at the apex of the collaboration process, was essentially the one that is in use today 1964 , though the name was changed in 1958 to the Armaments Committee..."[50] and again in 1966 to that of the Conference of National Armanent Directors (CNAD).

During the 1952-1956 period the achievements resulting from the Production Branch's considerable efforts in the coordination of production programs were rather limited. From 1952 to 1953 the emphasis fell most heavily on the creation of military industrial production capacity in Western Europe and on the build-up of the planned forces-in-being. For both of these the Production Branch came to play only a minor supportive role to the North American Aid programs which had assumed these tasks.

From mid-1953 to 1956 the primary emphasis was on standardization, which in the end was applied most fully to the production of ammunition, not equipment.[51]

In late 1956 the emphasis had shifted toward the concept of the maintenance of the production base. By 1956 factories in Europe were converting to the production of consumer goods as the OSP program began to run out. Prosperity in Europe was creating a demand for more factory space, and the leverage to initiate and maintain military production which the U.S. had previously exerted in its handing out of production work through OSP, was reduced as her expenditures tapered off.[52]

Accompanying these fluctuations in the overall emphasis were other efforts in more specialized fields. One field of study and planning that was becoming particularly important by 1954-56 time frame (and was interrelatd with efforts to maintain a continental European production base), was being carried out by the Spare Parts Coordination Section. This section of the Production and Logistics Division concerned itself with the development in Europe of facilities for the production of spare parts and maintenance of the considerable inventory of American equipment.[53] Chief among these were the F-84 and F-86 fighters, T-33 trainers, and the C-47 and C-119 cargo/transport aircraft. These efforts ultimately lead to the creation of the NATO Maintenance Supply Agency (NAMSA) in 1958.[54]

The process of correlated production planning during this period had involved meetings of national experts and the NATO staff to look at proposals of individual member countries, and suggest practical measures for extending the joint production effort beyond that of the previous limited Western Union and U.S. Off-Shore Procurement (OSP) efforts, as well as making it more economical and

efficient. The solutions recommended included:

> - one or two countries meeting the needs of all for the production of such major items as medium tanks;
> - in other instances where it was necessary and desirable to produce a particular item in a number of countries, the correlation studies were designed to ensure that production was on a standard pattern, or at least the number of models was reduced to a minimum.55

And as far as the time-frame envisioned, in the words of Lord Ismay:

> The correlation of production is not an attempt to revolutionize overnight the whole existing structure of defense production in Europe. This would disrupt vital supplies of equipment and could give rise to severe economic and social problems. The present efforts should be regarded as a beginning of a long-term task, involving gradual evolution of the production pattern.56

But as we've seen, the Alliance's defense production pattern evolved over the subsequent 25 years along lines quite different from those envisioned at the time. Though NATO's institutional aspects (i.e. the organization and its procedures) are still significant, they play only a secondary supportive role vis-a-vis the facilitation of ad hoc cooperation for individual projects at the nation-to-nation, not alliance level. Once again, this ad hoc collaboration is broken down into eight significant Modes treated in Part 2 of this paper.

2. 1956-1980

a. Institutional Developments Since 1956

By late 1956-early 1957 the movement to coordinate and share in new weapons development and production began to make headway within the Alliance on the NATO institutional level, but more significantly on the ad hoc level as well. As such, the roles of NATO in weapons projects from 1956 on (at least in those cases where NATO had any role at all) will be handled in the remainder of this paper, primarily on a fragmented, program-by-program basis, i.e., in Part 2. A description of the institutional procedures for collaboration and its corresponding organization since 1966 will be treated next and serve as background for the later study of individual ventures.

But first of all, there were the NATO initiated (with U.S. MWDP support) LWSR fighter and Atlantic maritime patrol aircraft projects. The latter of these inspired the introduction of the ill-fated NBMR procedure in 1959, contained in NATO Document C-M(59)82, for the implementation of cooperation in research, development, and production of military equipment. Along with this came an extension of the Defense Production Committees terms of reference to include research and development, and its name being changed to the Armaments Committee. The following year, the name of the Production and Logistics Division was changed to the Production, Logistics, and Infrastructure Division.

Then, in May, 1960 the Twenty Projects Exercise was launched. The NATO Defense Ministers, at their spring meeting, directed the Armaments Committee

NATO and Ad Hoc Interallied Cooperation in Research, Development, and Production of Weapon Systems

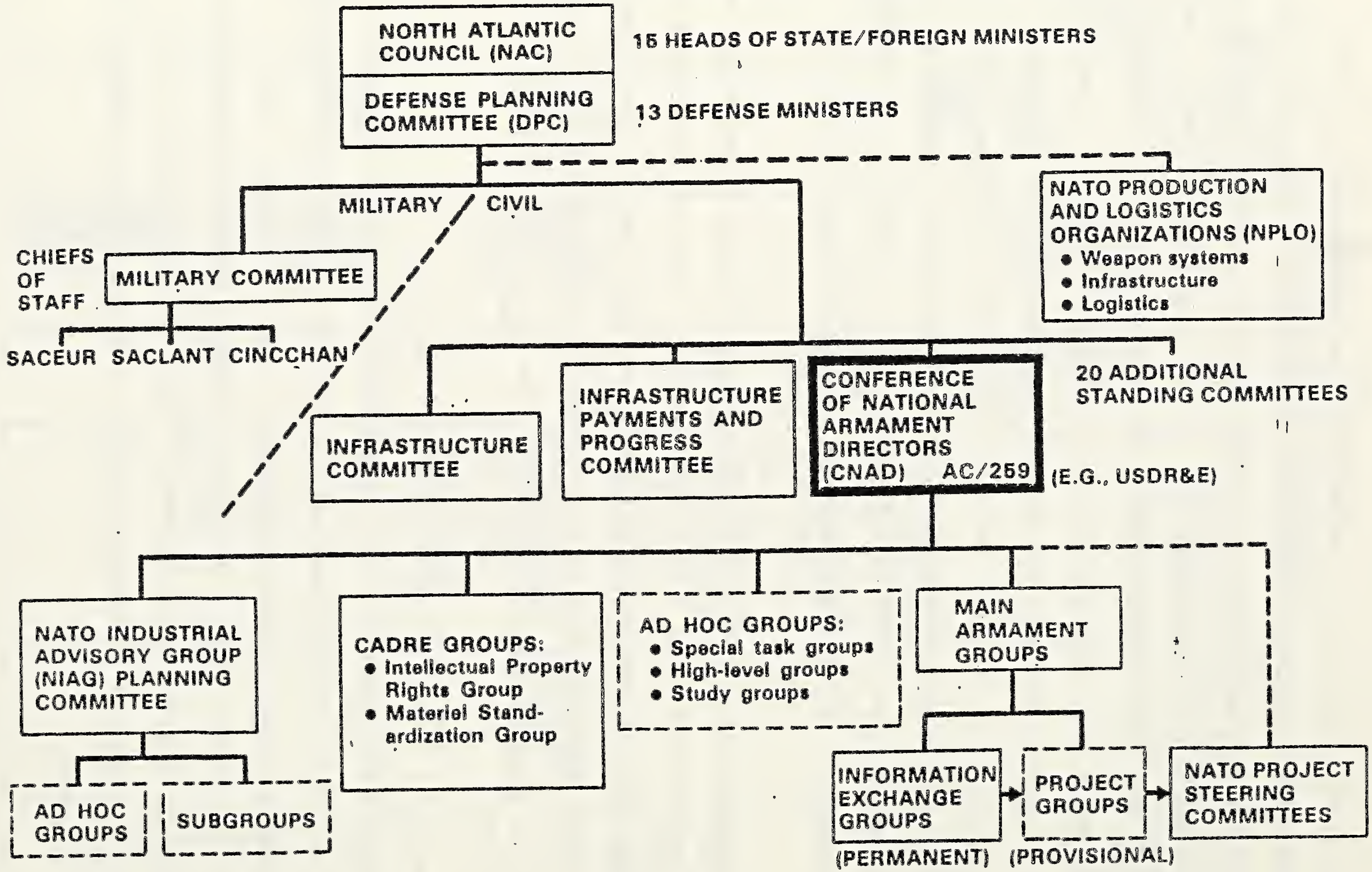
Dates	NATO Organization			U.S. Map	Projects		
	Committee of National Representatives	International Staff/ Secretariat	NATO Procedure		NATO Projects – Institutional	NATO Projects – Label Only	Interallied Projects Without NATO Sponsorship
1949-59	Military Production and Supply Board (1949-50) Defense Production Committee (1954-59)	Defense Production Board (1950-52) Production and Logistics Division (1952-60)	No codified procedures, but an excess of correlated production studies	Mainly through direct delivery of hardware, but also by means of Offshore Procurement (OSP) contracts U.S. Mutual Weapons Development Program (MWDP) funding MWDP	NATO LWSR fighter • First NATO-sponsored weapon system project • 1955-57 • Prototype competition followed by impasse • Fiat G-91 selected Atlantic maritime patrol aircraft • Second NATO project • Design competition and joint development • 1957 • Breguet 1150 • First joint development project		Meteor Canberra/B-57 Hawker Hunter F-86 Franco-German Tank Development Program (Leopard I/ AMX-30)
1959-66	Armaments Committee (1959-66)	Production, Logistics, and Infrastructure Division (1960-67)	NATO Basic Military Requirement (NBMR) procedures, NATO Document CM (59)82	OSP	NBMR procedures were inspired by the Atlantic maritime patrol aircraft, but no successful follow-up projects NBMR 3 (1959-62) alliance-wide design competition and impasse	Hawk, Sidewinder, Bullpup, F-104G, Mk 44 Torpedo (first joint production projects) Transall	M-113 MBT-70 AVS Fighter AFVG Fighter
Post 1966	Council of National Armament Directors (CNAD)	Defense Support Division	Procedures for Cooperation in Research, Development, and Production of Military Equipment NATO Document CM(66)33, allowing for greater flexibility than CM(59)82, and therefore a more satisfactory approach		Seasparrow MRCA Tornado PHM AWACS AIM-9L ASSM RAM	Jaguar	F-4 Alphajet Roland CH-47 CH-53 F-5 AV-8B F-16 SLMS CP-140 CF-18

Rev. 9/82

to draw up a select list of projects which would be suitable for closer cooperation in research, development, and production. Subsequently, the Committee reviewed a number of ideas submitted by countries (primarily the U.S.) and by the International Staff, and drew up a list of projects which showed some signs of being suitable for cooperative effort. For those enterprises which commanded sufficient support for immediate action to be taken, bodies known as Ad Hoc Mixed Working Groups were set up, within the new NBMR procedures. More than twenty of these groups focused on a variety of arms and equipment, including advanced types of aircraft, missiles and armored fighting vehicles, data handling, night vision, and combat intelligence equipment.[57] Very little of positive value came of this initiative.[58]

In October 1965, a high level group, entitled 'the Exploratory Group,' and designated AC/253 (i.e. Allied Committee #253), under the chairmanship of the Deputy Secretary General, James Roberts, was established for the purpose of reviewing NATO activities in arms research, development, and production as well as defense science. In June 1966, the Council of Ministers approved the Committee's report[59] which called for the abolition of the Armaments Committee and the establishment of a new, more flexible institutional framework. At the top of the new organizational pyramid was to be a Conference of National Armaments Directors (CNAD) meeting twice a year to formulate high-level policy. Between meetings the National Armaments Directors Representatives (NADREPS) would maintain continuity.[60] Below the CNAD (AC/259) were two general categories of subsidiary bodies - the Main Armament Groups and the Cadre groups.

Conference of National Armament Directors (CNAD) and Subgroupings



837138-5-A

The main armament groups originally included only the three military service Armaments Groups - one each for the Army (AC/225), Navy (AC/141), and Air Force (AC/224).[61] There is also a Defense Research Group (AC/243) which focuses on cooperative research.[62] Later, two additional groups were added - the Tri-Service Group on Air Defense (AC/280) and the Tri-Service Group on Communications and Electronic Equipment (AC/302). The most recently formed of these inter-service groups is the Tri-Service Group on Communications and Electronic Equipment (TSGCEE) which held its first meeting in June, 1977. As with its counterpart for air defense, CNAD decided to form a Tri-Service Group which would provide a single forum, composed of senior representatives from the national organizations concerned, one that would transcend service boundaries for these critical areas. The TSGCEE provides a focal point within NATO for resolving interoperability problems in the tactical com-munications, ECM-resistant data communications, identification, and navigation areas. Several previously existing CNAD bodies were transferred to the TSGCEE upon its formation.[63]

Most of NATO's working groups are project specific and are set up under one of the relevant Main Armament Groups. These groups meet periodically, from one to four times a year. Each meeting lasts from one to five days and takes place either in Bruxelles or in the country serving as pilot nation for the given sub-group.

Other working groups, however, are functionally oriented and directed toward working issues concerning collaboration generally. These are included in that second category of groups called Cadre Groups. These included:

- the Working Group on Industrial Property (AC/94);
- Group of National Directors for Quality Assurance (AC/250);
- Group of National Directors on Codification (AC/135);
- Group on Materiel Standardization (AC/301);
- Group of Experts on Electronic Parts (AC/67), and;
- Group of Experts on the Conversion of Specifications and Dimensions of Drawings for U.S. aircraft (AC/82).

CNAD also has periodically set up other Ad Hoc Groups to deal with special projects that were not under a specific Main Armament Group but reported directly to the CNAD; e.g., High Level Group for NATO AEW&C, and the 2 Study Groups for the European replacement of the Improved Hawk and Nike Hercules missiles.

Toward the end of 1967, as part of a general reorganization of the International Staff/Secretariat, the Production, Logistics, and Infrastructure Division was renamed the Defense Support Division. In October 1968, it was announced that a NATO Industrial Advisory Group (NIAG) would be created to provide advice to CNAD and to represent a forum for the exchange of ideas and information between NATO officials and Allied industrialists. This group held its first meeting in Brussels in January 1969.

Also in 1968, at the initiative of British Defense Minister Healey, Eurogroup was set up within NATO.

CNAD, its subordinate military Main Armaments Groups and NIAG and the concommitant new procedures contained in <u>NATO Document C-M(66)33</u> are those in use as of 1980.

b. <u>CNAD and Subsidiary Bodies</u>

(1) <u>General Principles</u>

As a starting point for the new approach to collaboration, the following eight general principles were agreed to by the allied nations, each represented on the high level Ad Hoc working group AC/216:

(a) The principles that countries are responsible for equipping their own forces, whether NATO-assigned or not, remains valid. However, consideration should be given, as far as possible, to the opinions and recommendations of the NATO Military Authorities.

(b) The then existing procedure for formulating, promulgating, and implementing NATO Basic Military Requirements (NBMR) has proved unsatisfactory as a means of promoting co-operative action.

(c) Co-operation is indispensable for countries with relatively limited technical and economic resources; such co-operation should permit all members of the Alliance to participate in the research, development and production effort, to the extent of their willingness to contribute

effectively thereto. It is desirable generally as a means of making better use of existing resources, pro-moting standarizaiton, or at least operational compatibility, and facilitating logistic support.[64]

(d) It is politically desirable that such co-operation should take place in NATO or under the NATO aegis. A system should therefore be evolved whereby such a co-operation would be both efficient and attractive.

(e) The system should be based on the premise that valid decisions on the characteristics of equipment can only be made by those having responsibility for equipping forces. However, opportunity will be given to the NATO Military Authorities to express their views thereon.[65]

(f) This system should be permissive in that countries should bring their ideas for co-operative action to NATO for discussion. Subsequent action should be decided upon only by interested nations on a case-by-case basis in as free and flexible a manner as possible.

(g) The new system should provide for an adequate sharing of the scientific, technical and economic benefits resulting from each co-operative program, as a counterpart to the effective contributions of each country.

(h) Consultation on military operational concepts as well as exchange of information on specific projects, have in the past been very beneficial and should be continued.[66]

(2) Procedures

Following is a description of the procedures set up to implement the general principles. The co-operative process as a whole was to avoid the rigidity which had crept into the previous system. It is based on national proposals, or on proposals by the NATO Military Authorities commensurate with their responsibilities, and not on formal NBMRs duly promulgated by the latter. It was to be permissive in the sense that those countries wishing to join together to co-operate could do so in as free and flexible a manner as possible, subject only to the minimum of such general rules as are necessary in an Alliance of sovereign nations. In other words, cooperation was to be supported but not regulated by NATO. Nevertheless, in order that the overall view not be lost, the NATO Military Authorities had to be able to give their views as appropriate. Their role, however, was not to make decisions, but to provide advice when requested or when they consider it necessary. This was to include, in particular, periodic assessments of NATO long-term equipment requirements.[67]

The general sequence of events begins with a proposal for cooperative action being made by a country or by the NATO Military Authorities in the appropriate Main Armament or Tri-service Group. After a thorough discussion takes place, if it appears that one or more other countries is interested in that proposal, a Sub-Group is created and charged with providing the forum where interested countries could take action in two stages.[68]

At the first stage, the Sub-Group is to be open-ended and countries, after hearing more details of the proposal, can clarify their own national positions and decide whether to continue to participate. This stage ends when two or more countries express a desire to proceed on a step-by-step basis with the project or, after an adequate time for discussions, it becomes clear that no other country desires to join the proposing country in a co-operative project. In the light of past experience the desire to proceed should, apart from special cases, stem from the fact that the countries concerned have, or foresee, an appropriate operational requirement. This first stage should not continue more than a few months, six months at the longest, at the end of which the Sub-Group Chairman, a representative of the proposing country, should report the results of the first stage to the parent Group.[69]

Upon receiving the report from the Sub-Group, the Service Armaments Group receives a formal statement of intent (an MOU) from interested countries to proceed with the development and to commit resources thereto. The Service Armaments Group then invite the countries so committed to proceed with the project.

At the second stage, the Sub-Group is only composed of engaged nations. It undertakes the drafting of a set of agreed characteristics, the definition of the project or projects and, finally, the relevant timetable and cost estimate. This stage ends with the Sub-Group reporting back to the Service Armaments Group that a number of nations are now ready to take firm step-by-step commitments to develop and/or produce an item of equipment meeting the agreed characteristics, and to set up a Steering Committee and proceed with the project in co-operation. The Main Armament Groups examine this report and

obtain at that stage the confirmation of these firm step-by-step commitments. The Main Armament Groups then submit the project to the Conference of National Armaments Directors, recommending that it be endorsed.[70]

The Conference, acting under the authority of the Council, notes the submission of the project; it assures itself that the project meets the criteria established for the attribution of the qualification "NATO Project" and, if so, endorses it, thereby confirming this qualification on it. This entitles the committed countries the privilege of identifying the project as a "NATO Project", and setting up the corresponding NATO Project Steering Committee, with one of the nation's procurement agencies acting on behalf of all participants. In some cases, however, the participating nations choose to move outside the national procurement environment and set up instead a civil subsidiary agency of NATO, i.e. a NATO Production and Logistics Organization, or more commonly called an NPLO.

At all stages in the above sequence decisions rest with those actively participating, so that those countries who have voluntarily withdrawn at various points leave the engaged countries free to proceed further along the road of co-operation. This latter grouping decides on the manner in which it will work. However, the principle of unanimity applies in the taking of decisions, except those for which countries participating in a project agree by general consent will be taken otherwise.

In conformity with the agreed General Principles, the recognition of the qualification "NATO Project" is subject to the following conditions.

- the participation of two or more NATO countries in the co-operative project;

- an engagement to report progress annually to the Conference, until the equipment has been produced or the project otherwise terminated;

- the incorporation of provisions for the admission of other interested NATO countries, subject to the acceptance of reasonable and equitable conditions to be provided by the participating countries.[71]

In any NATO project, C-M(66)33 advises the participating countries to consider sub-contracting portions of the effort to the less industrially developed countries when practical, even though the latter cannot contribute funds to it.

In addition to the series of actions set out above, in order to encourage co-operation, exchanges of information of operational concepts, national equipment programs, and appropriate technical and logistic matters are also undertaken in the Service Armaments Groups; even when it is unlikely that there be any project in the near future for a particular item of equipment.

Discussions of longer-term activities in the research field where co-operative efforts might lead to future military equipment, or where advances in technology were required, are undertaken in the Defense Research Group. This Group provides advise on scientific and technical possibilities and the research necessary towards meeting military needs, and attempts to extend the range of scientific discovery in all fields which might have defense

applications. The main basis for this is exchanges of information and co-operative research undertaken in broad areas, which is sub-divided as required. This program ensures quicker and better application to defense objectives of scientific and technical development in all NATO nations and represents a major extension of co-operative activity within NATO of an international and inter-service character. In carrying out its tasks, the Group makes use of such features as seem appropriate, of the procedures defined above for the Service Armaments Group.

(3) Organization

The above procedures for future co-operation required a number of organizational changes for their implementation. These changes were as follows:

The three existing Service Advisory Groups, renamed Armaments Groups, became the main bodies responsible for promoting co-operation in developing and producing equipment, and in the relevant logistic aspects thereof, handling both operational requirements and the initiation of co-operative projects. The representation on these Groups are capable of speaking with authority on operational concepts and national programs. The Groups remain directly responsible to the North Atlantic Council, as represented by CNAD.[72]

The three Service Armaments Groups were first augmented by the new Defense Research Group[73] which is responsible for promoting co-operation in research and technology which might lead, in the long term, to future equipment. This Group undertakes such research studies on its own initiative. At the request of the Service Armaments Groups, it also undertakes studies in fields where requirements cannot be met for technological reasons.

The NATO Conference of National Armaments Directors (CNAD) meets twice a year, having special status as a body acting under the authority of the Council in respect of defense equipment and connected problems. It is composed of senior governmental representatives responsible for defense equipment (e.g. DDR&E, or as of more recently USDR&E for the U.S.). With respect to the Armaments Groups and the Defense Research Group, the Conference is informed of their progress and discuss problems which cannot be resolved by them. It also considers the more important political, economic and technical aspects of the provision of equipment for NATO forces and may issue broad directives thereon.[74]

To provide a point of contact with its National Armaments Director, each country designates a member of its permanent delegation to NATO as the representative of its National Armaments Director. These NADREPS meet as required, at the call of and under the chairmanship of the Assistant Secretary General for Defense Support to prepare the business of the Conference and to undertake such tasks as the Conference may direct.[75]

(a) Composition, Attendees, and Terms of Reference of the Conference of National Armaments Directors

(i) The Conference of National Armaments Directors is composed as follows:

Chairman: The Secretary General of NATO or his Deputy.

Members: - Senior governmental representatives responsible for armaments matters and for the application of science and technology to military problems.

- The authorized representative of the Military Committee, who may be assisted by representatives of the Major NATO Commands.[76]

(ii) The meetings of the Conference of National Armaments Directors are also attended by:

- The Chairman of the Naval Armaments, Air Force Armaments, Army Armaments, Defense Research Groups, the Tri-Service Group on Air Defense, and the Tri-Service Group on Communications and Electronic Equipment.

- The Assistant Secretary General for Defense Support and the Assistant Secretary General for Scientific Affairs.[77]

(iii) The Conference of National Armaments Directors have the following terms of reference.

- Advise the Council and act under its authority on all questions pertaining to the development and procurement of equipment for NATO forces and connected problems.

- Review the overall co-operative effort undertaken within NATO, under the aegis of the Naval Armaments, Air Force Armaments, Army Armaments the two tri-service groups and Defense Research Groups, paying particular attention to the political, economic and technical aspects thereof.

- Resolve difficulties encountered by the six Groups and avoid any duplication of effort between them.

- Provide, as a result of 2 and 3 above, each of the six Groups with the appropriate advise and guidance on matters connected with the equipping of forces and the logistics aspects thereof.[78]

- Maintain close liaison with the NATO Military Authorities and ensure that similar liaison is maintained between the six Groups, the NATO Military Authorities and the Defense Review Committee.

- Ensure that co-operative projects meet the criteria established for the attribution of the "NATO Project" qualification; endorse the co-operative projects by conferring on them the "NATO Project" qualification; entitle the interested countries to set up the appropriate NATO Steering Committee.

- Direct the work of bodies undertaking general activities of a logistics or adminstrative nature (Cadre Groups) in its field of responsibility.

- Report to the Council as required.[79]

(b) <u>Composition and Tasks of the National Armaments Directors' Representatives (NADREPS)</u>

(i) The NADREPS meet as follows:

Chairman: Assistant Secretary General for Defense Support.

Members: - Senior members of national delegations concerned with arms co-operation in NATO.

(ii) The meetings of the NADREPS are also attended by:

(a) the Director of Armaments and Defense Research;

(b) a representative of the International Military Staff.

(iii) The NADREPS undertake:

(a) the routine tasks of the Conference, and;

(b) such tasks as the Conference may direct.[80]

(c) <u>Composition Attendees, and Terms of Reference of the Main Armaments Groups</u>

(i) The Main Armament Groups are NNAG (AC/141), NAFAG (AC/224) and NAAG (A/C 225) and also include the two Tri-Service Groups are TSGAD (AC/280) and TSGCEE (AC/302). They are composed as follows:

Chairman: National Representative (by election every two years).

Vice-Chairman: Director of the Defense Support Division (International Staff).

Members: Senior national operational and/or technical representatives capable of speaking with authority on service or tri-service operational concepts and national research, development and production programs.[81]

(ii) The meetings of the Main Armament Groups are also attended by:

- representatives of the NATO Military Authorities, as appropriate;

- the Heads of Section of the Defense Support Division, as appropriate (International Staff).[82]

(iii) The Main Armaments Group (including the Tri-Service Groups) have the following terms of reference:

- Exchange information on national concepts and doctrines of air, naval, or land warfare, air defense, and communications and electronic equipment with a view to identifying common concepts and doctrines.

- Exchange information on national equipment programs and policies, as well as on the logistics aspects thereof.

- Exchange information on national programs of defence research and development relating to weapon systems and equipment for the relevant service or interservice field undertaken in implementation of 1 and 2 above.

- Identify suitable areas or individual proposals for bilateral or multilateral co-operation resulting from 3 above; set up such subordinate bodies as may be required for the implementation of co-operative projects; submit to the conference as a "NATO Project" those for which two or more countries are ready to set up a NATO Project Steering Committee;

- Co-operate fully and maintain close liaison with the other Main Armament, Tri-Service, and Defense Research Groups with a view to avoiding duplication of effort. To this end, these Groups when practical, either jointly or under the direction of the Conference, designate one of them to act for such activities in their domain as are of interest to more than one of them.

- Report periodically to the Conference of National Armaments Directors on progress and submit to it those problems for which a solution is required including, inter alia, the setting up of NATO Steering Committees.[83]

(d) <u>Composition Attendees, and Terms of Reference of the Defense Research Group</u>

(i) The Defense Research Group is composed as follows:

Chairman: National Representative (by election every two years).

Vice-Chairman: Director of the Defense Support Division (International Staff).

Members: Senior National representations capable of speaking with authority on the application of science and technology to military problems and resulting national research programs.

(ii) The meetings of the Defense Research Group are also attended by:

(a) representatives of the NATO Military authorities, as appropriate;

(b) a representative of the Division of Scientific Affairs International Staff).[84]

(iii) The Defense Research Group has the following terms of references:

- Exchange information on new research and technology which might lead to future equipment.
- Review the possible military consequences of advances in the fields of science and technology.

- Identify suitable areas or individual proposals for bilateral or unilateral co-operation in defence research, resulting from 1 and 2 above, and set up such subordinate bodies as may be required for the implementation of appropriate co-operative research studies and programs.[85]
- Undertake studies, at the request of any of the Service Armament and Tri-Service Groups, in fields where requirements cannot be met until a breakthrough or a serious advance in technology has been achieved.
- Co-operate fully and maintain close liaison with the Service Armament and Tri-Service Groups, with a view to avoiding duplication of effort. To this end, these six Groups shall, when practical, either jointly or at the direction of the Conference, designate one of them to act for such activities in their domain as are of interest to more than one of them.
- Continue, as necessary, the studies undertaken by the former Committee of Defense Research Directors on the long-term aspects of specialized fields.
- Examine matters of defence research policy which may be of interest or common concern to NATO countries.
- Refer to the Science Committee any problems of general or specific interest bearing on the work of the Defense Research Group and on which the Science Committee is deemed to be specially qualified.
- Report periodically to the Conference of National Armaments Directors on progress and submit to it those problems for which a solution is required.[86]

(4) U.S. REPRESENTATIVES TO CNAD GROUPS AS OF OCTOBER 1979

PANEL NUMBER	TITLE	U.S. REPRESENTATIVE
AC/259	Conference of National Armament Directors	Dr. William J. Perry Undersecretary of Defense (Research and Engineering) Pentagon
NADREPs	National Armaments Directors' Representatives	Colonel Daniel K. Malone (USA) Director, Armaments & Standardization Division US Mission to NATO, Brussels, Belguim

NATIONAL REPRESENTATIVES TO CNAD GROUPS

PANEL NUMBER	TITLE	U.S. REPRESENTATIVE
AC/141	NATO Naval Armaments Group	RADM Frederick G. Fellowes Director, Tactical Air, Surface and EW Development Division (OP-982) Office of Research, Development, Test and Evaluation Office of the Chief of Naval Operations The Pentagon
SWG/7	NATO Frigate Replacement for the 1990's	CHAIRMAN: Capt D.E. Woodbury Surface Plans/Combatants/Readiness (OP-321) Surface Warfare Division Deputy Chief of Naval Operations (Surface Warfare) The Pentagon US REP: LCDR W.C. Stolgitis Systems Development Department (Code 1152) David Taylor Naval Ship Research and Development Center Carderock, MD
SWG/9	NATO Naval Evaluation, Acceptance and Test (NNEAT) Procedures	Capt. H.A. French Deputy Chief of Staff for Operations Commander, Test and Evaluation Force Naval Station Norfolk, VA

PANEL NUMBER	TITLE	U.S. REPRESENTATIVE
AC/141 (Cont.)		
IEG/1	Above-Surface Wareface	Capt. W.G.A. Sympson Weapons Support Section (OP-982F2) Surface Warfare Branch Tactical Air, Surface and EW Development Division Office of Research, Development, Test and Evaluation Office of the Chief of Naval Operations The Pentagon
IEG/1(SWG/4)	Electronic Warfare	Capt. V.D. Shirley C2, EW and Sensors Section (OP-982F3) Surface Warfare Branch Tactical Air, Surface and EW Development Division Office of Research, Development, Test and Evaluation Office of the Chief of Naval Operations The Pentagon
IEG/1(SG/7)	Limited Self-Defense Capability for Minelayers, MCM Vessels and Their Auxiliaries	CDR Deniis N. Tsukalas Commander, Mine Wareface Command Charleston, VA
IEG/1(SG/8)	Over-the-Horizon Targeting	LCDR Charles E. Boehmer Satellite Surveillance Branch (OP-986E) Command and Control Division Office of Research, Development, Test and Evaluation Office of the Chief of Naval Operations The Pentagon
IEG/2	Undersea Warfare	Capt. P.B. Grozen Deputy Director, Undersea and Strategic Warfare Development Division (OP-981B) Office of Research, Development, Test and Evaluation Office of the Chief of Naval Operations The Pentagon
IEG/2(SG/5)	Torpedos	Mr. J. Andreas Asst. Dir., Torpedo Systems and Fleet Support Div. (SEA-662DB)

Submarine Systems Subgroup
Weapons Systems and Engineering
Director

PANEL NUMBER	TITLE	U.S. REPRESENTATIVE
AC/141 (Cont.)		
		Naval Sea Systems Command Washington, D.C.
IEG/2(SG/8)	Sonobuoy Interoperability	Mr. Daniel A. Rosso (Alt: Mr. Tom Guarini) Administrator, Surveillance Technology (AIR-370) Asst. Commander for Research and Technology Naval Air Systems Command Washington, D.C.
IEG/3	Mines and Mine Countermeasures	CDR R.W. Ortengren Surface ASW and Mine Warfare Branch (OP-981F1) Office of Research, Development, Test and Evaluation Office of the Chief of Naval Operations The Pentagon
IEG/3(SG/4)	Future Mine Countermeasure Systems for the Post-1985 Timeframe	CDR D. Tsukalas (see IEG/1(SG/7))
IEG/3(SG/5)	Future Mines and Related Subsystems	CDR R.W. Ortengren (see IEG/3)
IEG/4	Maritime Air	Capt. M.K. Seibert Alt: Capt. P.J. Braun (OP-981E) Head, Air Warfare Branch (OP-982E) Tactical Air, Surface and EW Development Division Office of Research, Development, Test and Evaluation Office of the Chief of Naval Operations The Pentagon
IEG/4(SG/2)	Airborne Vehicle for the NATO Frigate Replacement for the 1990's	Mr. John J. March Systems Analysis Division (ASW Team) (AIR-526Y) Assistant Commander for Material Acquisition Naval Air Systems Command Washington, D.C.
IEG/4(SG/3)	Future Lightweight Short-Range Air-Launched Anti-Surface Ship Missile	Capt M.K. Seibert (see address under IEG/4)

PANEL NUMBER	TITLE	U.S. REPRESENTATIVE
AC/141 (Cont.)		
IEG/5	Tactical Control and Data Handling	CHAIRMAN: Capt. John F. Stader Director, Software Management Subground (SEA-615) Combat Systems Design and Integration Group (Software Management) Weapons Systems and Engineering Director Naval Sea Systems Command Washington, D.C. US REP: CDR Charles D. Lodge (OP-942) Command, Control and Information Systems Command, Control and Communications Program Office of the Chief of Naval Operations The Pentagon
IEG/6	Ship Design	CHAIRMAN: Capt B.F. Tibbitts Director, Ship Design and Integration (SEA-03D) Ship Design and Engineering Directorate Naval Sea Systems Command Washington, D.C. US REP: CDR Thomas A Vajda Surface Warfare Branch (OP-982P11) Tactical Air, Surface and BU Development Division Office of Research Development Test and Evaulation Office of the Chief of Naval Operations The Pentagon.
IEG16(SG/3)	Ship Vibration and Shock	Mr. Anthony R. Paladino Ship Silencing Division (Flow, Prop and Vibration) (SEA-05H) Research and Technology Directorate Naval Sea Systems Command Washington, D.C.
IEG/6(SG/4)	Electrical Power Generation and Distribution	Mr. F.R. Henrikson Asst. for Electrical Systems (Submarine Analysis) (SEA-542) Naval Sea Systems Command Washington, D.C.

PANEL NUMBER	TITLE	U.S. REPRESENTATIVE
C/141 (Cont.)		
IEG/6(SG/5)	Seakeeping	Mr. G.G. Cox Ship Performance Department (Code 15) David Taylor Naval Ship Research and Development Center Carderock, MD
IEG/6(SG/6)	Pollution Abatement with Respect to NATO Warships	Mr. L.J. Koss Technical Support Division (Ship Improvement) (SEA-0483P) Fleet Support Directorate Naval Sea Systems Command Washington, D.C.
IEG/6(SG/7)	Ship Vulnerability and Survivability	Mr. Jerry R. Sullivan Ship Survivability Division Naval Sea Systems Command Washington, D.C.
IEG/6(AHWG)	Point Designs for the NATO Frigate Replacement for the 1990s	Mr. G. Kerr Advanced Design Branch (SEA-312) Ship Design Division Naval Sea Systems Command Washington, D.C.
IEG/6(AHWG)	Ship Habitibility	Mr. Daniel J. Weiler Ship Arrangement/Desing Branch Naval Sea Systems Command Washington, D.C
PG/14	Explosive Resistant Multi-Influence Sweep System (ERMISS)	Mr. W.A. Steadley Systems Engineer (PMS-4077) Mine Warfare Systems Project Naval Sea Systems Command Washington, D.C.
PG/15	Electro-Optical Devices	Mr. Laverne E. (Bill) Triggs Surface Combat Systems Division (OP-35E) Deputy Chief of Naval Operations (Surface Warfare) Office of the Chief of Naval Operations The Pentagon
PG/16	Anti-Surface Ship Missile (NATO ASSM)	CDR L.L. Smith (OP-982F21) Surface Warefare Branch (Missile Support) Tactical Air, Surface and EW Development Division Office of Research, Development, Test and Evaluation

PANEL NUMBER	TITLE	U.S. REPRESENTATIVE
AC/141 (Cont.)		
		Office of the Chief of Naval Operations The Pentagon
PG/17	NATO "6-S" System	Capt. W.G.A. Sympson (see address under IEG/1)
PG/20	An Airborne Electro-Optical System for Identification of Maritime Surface Targets	Mr. H. Peter Leet Consultant and Coordinator for Laser and Infrared Systems (Code 31505) Naval Weapons Center China Lake, CA
PG/21	NATO General Purpose Ground Mine for the Post-1985 Timeframe	CDR R.W. Ortengren (see address under IEG/3)
PG/22	Mechanical Sweeps for the Post-1985 Timeframe	CDR D.N. Tsukalas (see address under IEG/1(SG/7))
PG/23	NATO Cableless Remote Controlled System for Sea Mines for the Post-1985 Timeframe	CHAIRMAN & US REP: CDR R.W. Ortengre (see address under IEG/3)
PG/24	NATO Soft Weapon System for Anti-Ship Missile Defense for	CDR Ronald A. Lee Alt: Mr. J. Montgomery (NRL Code 5700) Surface and Shore-Based Systems Division (Ship EW R&D) (PME-107-5B) REWSON Systems Project Naval Electronics Systems Command Washington, D.C.
PG/25	NATO Maritime Electronic Warfare Support Group (MEWSG)	LCDR D.E. Fandrei Policy and Doctrine Branch (OP-944C2) Electronic Warfare and Cryptology Division Command and Control Directorate Office of the Chief of Naval Operations The Pentagon
PG/26	Self-Contained Remotely Controlled Mine Hunting System	CHAIRMAN & US REP: CDR D.N. Tsukalas (see address under IEG/1(SG/7))
AC/224	NATO Air Force Armaments Group	Brig. Gen. Reichard W. Phillips Jr. Deputy Direction Directorate of Operational

Requirements
DCS/R&D
HQS USAF
Pentagon

PANEL NUMBER	TITLE	U.S. REPRESENTATIVE
AC/224 (Cont.)		
SG/6	Tactical Air Reconnaissance/ Intelligence	CHAIRMAN: LtCol. R.J. Bannach HQ AFSC/SDW Andrews AFB, MD US REP: Maj. William S. Rogers HQ AFSC/SDWI Andrews AFB, MD
SG/7	Approach and Landing Systems	Maj. Robert E. Heath II HQ USAF/RDST Pentagon
SG/9	Air-to-Ground Munitions	Maj. Stanley C. Green HQ USAF/RDQA Pentagon
SG/11	Air Aspects of Electronic Warfare	Maj. Llewellyn R. Sweeney HQ USAF/RDPE Pentagon
NAEWTF	Open-Ended Project Group on a NATO Aircrew Electronic Warfare Tactics Facility	Maj. Llewellyn R. Sweeney (see SG/11)
SG/13	Air-to-Air Missiles for the 1980s and Beyond	CHAIRMAN: LtCol. Albert C. Piccirillo HQS USAF/RDQA Pentagon US REP: Maj. Charles D. Ogren HQ USAF/RDQA Pentagon
SG/15	Unmanned Aircraft	CHAIRMAN: Col Theodore C. Freitag HQ USAF/RDPE Pentagon US REP: Cap. Teddy L. Hollis HQ USAF/RDPE Pentagon
SG/16	Interoperability of Aircraft and Their Weapons Systems	Capt. Donald K. Wilson (USN) OUSDRE/AMRAM Pentagon
PLSS	Ad Hoc Group on Precision Location Strike System	Maj. Joseph A. Koenig HQ USAF/RDPDV Pentagon
C/225	NATO Army Armaments Group	MG R.J. Lunn, (USA) HQDA (DAMA-ZB)

PANEL NUMBER	TITLE	U.S. REPRESENTATIVE
AC/225 (Cont.)		
		Washington, D.C.
Panel II	Combat and Support Vehicles	LTC W.L. Ivey HQDA (DAMA-WSW) Washington, D.C.
Panel III	Infantry Weapons	Maj. Jack Woods HQDA (DAMA-WSW) Washington, D.C.
Panel III, SP.1	Subpanel on NATO 7.62 and 9mm Ammunition	Mr. Robert Udell (Ohmn-US Rep) Small Arms Ammunition DRDAR-SCA-AP ARRADCOM Dover, NJ and Mr. Charles L. Fulton DRDAR-TSE (Supt N. Amer Regn Test Center) ARRADCOM Dover, NJ
Panel III, SP.3	Subpanel on the Study of the Operational Effectiveness of Anti-Armour Weapons	LTC D. Brent Pope HQDA (DAMA-WSW) Washington, D.C.
Panel III/ CCEE	Co-ordinating Panel for the Testing and Evaluation of Small Arms, Ammunition and Weapons	Maj. Jack Woods HQDA (DAMA-WSM) Washington, D.C.
Panel III/ NSMATCC	NATO Small Arms Test Control Commission	LTC Anthony Bisantz (USA) (detailed to Hammelberg, Germany)
Panel III/WP	Working Party on Chamber Pressure Measurements	Mr. Charles Fulton and Mr. Robert Udell (see address under Panel III/SP.1)
Panel IV	Surface-to-Surface Artillery	Maj. Edward Anderson HQDA (DAMA-WSW) Washington, D.C.
Panel IV/ SP.1	Subpanel on Interoperability of ADP-Equipped NATO Surface-to-Surface Artillery Units	Maj. John M. Shanholtzer ATST-TSM-TF US Army Field Artillery School Fort Sill, OK
Panel IV/ SP.2	Subpanel on Accuracy, Ballistics and Chemistry	<u>Accuracy/Ballistics</u> Mr. Charles H. Lebegern, Jr. Ballistician Aberdeen Proving Ground, MD

PANEL NUMBER	TITLE		U.S. REPRESENTATIVE
AC/225 (Cont.)			
Panel IV/ SAG	Study Advisory Group on Anti-Artillery		Maj. Edward Anderson (see address under Panel IV)
Panel V	Land-Based Air Defense Weapons		Mr. Peter O. Olson US Army Air Defense School Ft. Bliss, TX DA Point of Contact LTC OLJ. Thomassett HQDA (DAMA-WSM) Washington, D.C.
Panel VI	Combat Intelligence		LTC Jack Humes HQDA (DAMA-CSC) Washington, D.C.
Panel VII	NBC Defense	C/B:	LTC Jimmie Floyd HQDA (DAMA-CSM) Washington, D.C.
		Nuc:	Maj. R.L. Harter HQDA (DAMA-CSM) Washington, D.C.
Panel VII/ ASP	Air Subpanel		LTC John R. Bushman HQ, USAF Washington, D.C.
Panel VII/ NSP	Naval Subpanel		Mr. R.V. Vittucci US Navy Material Command Washington, D.C.
Panel VII/ GEC	Exploratory Group of Experts on Chemoprophylaxis		Dr. T.R. Sweeney Dep Director Division of Experimental Therapeutics Washington, D.C. Walter Reed Army Institute of Research
Panel IX	Engineer Equipment		LTC Richard H. Gates HQDA (DAMA-CSM) Washington, D.C.
Panel X	Interservice Group on Air Vehicles for Tactical Air Mobility		LTC Kalman Csoka HQDA (DAMA-WSA) Washington, D.C.
Panel XI	Tactical and Logistical Concepts Panel		Col. Richard C. Strudeman US Army Concepts Analysis Agency Bethesda, MD

PANEL NUMBER	TITLE	U.S. REPRESENTATIVE
AC/225 (Cont.)		
Panel XII	Meteorology	CHAIRMAN: Dr. Frederick Horning Atmospheric Sciences Laboratory U.S. Army Electronics Command DELAS-BE White Sands Missile Range, NM PRINCIPAL: Mr. Morris DELAS-DP
PG/14	Terminal Guidance System for Anti-Armor Munitions	Maj. George Tonn HQDA (DAMA-CSM) Washington, D.C.
PG/15	Night Vision Equipment	LTC A.M. Haynes, Jr. HQDA (DAMA-CSC) Room 3D433
PG/16	Smoke	LTC Raymond Bills HQDA (DAMA-CSS) Washington, D.C.
AC/243	Defense Research Group	CHAIRMAN: Dr. Ruth M. Davis Deputy USDR&E (R&AT) Pentagon

(Prime responsibility for AC/243 rests with the Air Force; however, there are a few panels pertinent to Army and Navy matters).

Panel I	Long Term Scientific Studies	Mr. Seymour (Cye) Deitchman Institute for Defense Analyses Arlington, VA
Panel III	Physics and Electronics	Dr. Lawrence C. Kravitz AFOSR/CC Bolling AFB Washington, D.C.
Panel III/ RSG.2	Research Study Group on Characterized Electronics Materials	Mr. Charles Sahagian AFCRL/LPO Hanscom AFB, MA
Panel III/ RSG.6	Radar Propagation Due to Low-Level Ducts Over the Sea	Dr. Juergen H. Richter Naval Electronics Laboratory Center San Diego, CA
Panel III/ RSG.8	Millimeter Wave Propagation	Dr. E.E. Altshuler AFCRL/LZN AF Cambridge Research Laboratories Hanscom AFB, MA

PANEL NUMBER	TITLE	U.S. REPRESENTATIVE
AC/243 (Cont.)		
Panel III/ RSG.9	Image Processing	Mr. Victor LaGarde USAWES Vicksburg, Miss
Panel III/ RSG.10	Speech Processing	Dr. Bruno Beek Rome Air Development Center - IRAA Griffiss AFB, NY
Panel III/ RSG.11	Automatic Pattern Recognition in Battlefield Surveillance with Mechanical Waves	
Panel III/ RSG.12	Maritime Remote Sensing	Mr. Hans Dolezalek Geography Programs Office of Naval Research Arlington, VA
Panel IV	Optics and Infra-Red	Dr. John M. MacCallum E-O Technology Program Office Naval Research Laboratory Washington, D.C.
Panel IV/ RSG.2	Solid State Targets and Arrays for Thermal Imaging	Mr. F.C. Petito AMSEL-NVL-FIR Night Vision Laboratory Ft Belvoir, VA
Panel IV/ RSG.5	Anti-Ship Infra-Red Missiles and Counter-Measures	Mr. George Harvey Naval Research Laboratory Washington, D.C.
Panel IV/ RSG.6	Infra-Red Signatures of Aircraft, Helicopters and Anti-Aircraft Missiles and Related Counter-Measures	Mr. J.T. Hall Eglin AFB, FL
Panel IV/ RSG.7	Definition and Measurement of System Parameters of Imaging Systems and Optimization of These Parameters	Mr. J.T. Wood Army Night Visition and Electro-Optics Laboratory DELNV-VI Ft Belvoir, VA
Panel IV/ RSG.8	Optical and IR Atmospheric Effects	Dr. Robert Senn Air Force Geophysics Laboratory
Panel IV/ RSG.9	Electro-Optical Surveillance and Tracking Techniques	(no designated representative)
Panel IV/ RSG.11	Two-Dimensional Detector Arrays with Integral Electronic Read-	Mr. Steven Campana Naval Air Development Center

PANEL NUMBER	TITLE	U.S. REPRESENTATIVE
C/243 (Cont.)		
	out for Thermal Sensors	
Panel V	Identification of Submarines Long Term	Capt. J.E. Bender Head, Submarine Warfare Branch (OP-981G) Undersea and Strategic Warfare Development Division Office of Research, Development, Test and Evaluation Office of the Chief of Naval Operations The Pentagon
Panel V/ RSG.11	A Non-Obtrusive Acoustic Identification System	(to be assigned)
Panel VII	Defense Applications of Operational Research	CHAIRMAN & US REP: Mr. Seymour Deitchman (see Panel I)
Panel VIII	Defense Applications of Human and Biomedical Sciences	Col. Phillip E. Winter, USA Office, Deputy Under Secretary of Defense for Research and Engineering (R&AT) Room 3D 129, Pentagon
Panel VIII/ RSG.2	Protection of Personnel Against Non-Ionizing Electromagnetic Radiation	Capt. P.E. Tyler U.S. Navy Washington, D.C.
Panel VIII/ RSG.3	Prophylaxis and Therapy Against Chemical Agents	Mr. Thomas Dashiell Office of Environmental and Life Science OUSDR&E/R&AT Pentagon
Panel VIII/ RSG.4	Physical Fitness	Dr. James Vogal USARIEM Natick, MA
Panel VIII/ RSG.5	Assessment of Ionizing Radiation Injury in Nuclear Warfare	LTC L.F. Winans HQUSAF Washington, D.C.
Panel IX	Electronic Warfare Concepts and Technology	Dr. Gunnar P. Ohman Tactical Electronic Warfare Division Naval Research Laboratory Washington, D.C.
Panel X	Long-Term Research Related to Air Defense	Dr. William McCorkle MIRADOM, DRDMI-T

PANEL NUMBER	TITLE	U.S. REPRESENTATIVE
AC/243 (Cont.)		
		Redstone Arsenal Huntsville, Ala.
Panel X/ RSG.2	Concealment and Deception	(no designated representative)
Panel X/ RSG.3	Technniques for Advanced Surface-Based Radars for SAM Systems	Mr. W. G. Spaulding U.S. Army Missile R&D Command DRDMI-TER Redstone Arsenal, AL
Panel X/ RSG.5	Techniques for Advanced Missile Seekers	Mr. Franklin H. Knemeyer CDR, Naval Weapons Center China Lake, California
Panel X/ RSG.7	Anti-Radiation Missile Counter-measures for Air Defense Systems	CHAIRMAN: Dr. Donald Sutherlin CDR, MIRADCOM Redstone Arsenal, AL US REP: Mr. A. Jolly MIRADCOM, DRDMI-TDW Redstone Arsenal, AL
Panel X/ RSG.8	Command and Control Systems for Air Defense	(no designated representative)
CCD	Special Group on Concealment, Camouflage, and Deception ATTN: DRDME-RTC Fort Belvoir, VA	Mr. Allen T. Sylvester USAMERADCOM
AC/280	Tri-Service Group on Air Defense (TSGAD)	Col. J.V. Adams HQ USAF/RDQSD Pentagon
WG/1	Working Group on Air Defense Philosophy and Doctrine	LTC T.A. Cardwell HQ USAF/XOXF Pentagon
AC/302	Tri-Service Group on Communications and Electronic Equipment	(unknown)
(ADP)	Special Working Group on Automatic Data Processing Equipment	"
(NBDS)	Special Working Group on Narrow Band Digital Speech	"
(SG/1)	Sub-Group No. 1 on Tactical Area Communications	"
(WG/1)	Working Group on STANAG 5040	"

PANEL NUMBER	TITLE	U.S. REPRESENTATIVE
AC/302 (Cont.)		
	Improvements	
(WG/2)	Working Group on Facsimile Interoperability	(unknown)
(WG/3)	Working Group on Replacement Systems Requirements	"
(WG/4)	Working Group on Replacement System Standards	"
(SG/2)	Sub-Group No. 2 on Tactical Radio Equipment	"
(WG/3)	Working Group on Tactical Radio Equipment for use in Maritime Environment	"
(WG/4)	Working Group on Tactical Radio Equipment for use in the Air Environment	"
(WG/5)	Working Group on Interoperability Standards for EECM	"
(WG/6)	Working Group on Interoperability Standards for Modems	"
(SG/4)	Sub-Group No. 4 on Navigation and Position Finding	"
(WG/1)	Working Group on Low Cost Inertial Navigation Systems	"
(SG/4)		
(WG/3)	Working Group on a Shipborne Integrated Navigation System	"
(SG/5)	Sub-Group No. 5 on Identification	"
(WG/1)	Working Group on Air-to-Air Identification	"
(WG/2)	Working Group on Self-Interference	"
(WG/3)	Working Group on the Revision of STANAG 5017	"

PANEL NUMBER	TITLE	U.S. REPRESENTATIVE
AC/302 (Cont.)		
(SG/8)	Sub-Group No. 8 on Tactical Satellite Communications Terminals	"
(PG/2)	Project Group on the NATO Identification System	(unknown)
(WG/1)	Working Group on the Direct Sub-System	"
(WG/2)	Working Group 1 - Operational Experts Group Working Group on the Indirect Sub-System	"
(PG/3)	Project Group on Multifunctional Information Distribution Systems	"
(WG/1)	Technical Working Group on MIDS STANAG	"
(PG/4)	Project Group on Low Cost Inertial Navigation Systems for Ships	"
AC/82	Group of Experts on the Conversion of US Aerospace Material Specifica tions	"
(SG/I)	Sub-Group on Metallic Materials	"
(SG/II)	Sub-Group on Non-Metallic Materials	"
AC/135	Group of National Directors on Codification	"
(Panel A)	Panel A on General Matters concerning Codification	"
(Panel C)	Panel C on Problems of Automatic Data Processing in Codification	"
AC/250	Group of National Directors for Quality Assurance	"
(SG/VIII)	Sub-Group VIII on the review and development of AQAPs and associated quality assurance documentation	"
(SG/IX)	Sub-Group IX for defense equipment reliability and maintainability	"

PANEL NUMBER	TITLE	U.S. REPRESENTATIVE
AC/250 (Cont.)		
	assurance	
(SG/X)	Sub-Group X on Quality Assurance of Software	"
(WG.5)	Working Group on NATO Quality Assurance Glossary	(unknown)
	3rd Symposium on Quality Assurance	"
AC/258	Group of Experts on Safety Aspects of Transportation and Storage of Military Ammunition and Explosives	"
(ST)	Storage Sub-Group	"
(RA)	Rail Transportation Sub-Group	"
(RO)	Road Transportation Sub-Group	"
(EED)	Sub-Group on Electro-explosive devices	"
(UGS)	Sub-Group on Underground Storage	"
AC/94	Working Group on Intellectual Property	Mr. Walter Henderson OUSDRE Washington DC AND Mr. William Gapcynski JAG-A Washington DC
AC/308	Working Group on RSI: Improvement of STANAGs and the Role of the MAS	LTC Regis J. Reynolds (USA) Armaments & Standardization Division U.S. Mission to NATO, Brussels, Belgium
AC/301	Group of Materiel (ACSM) Standardization	Mr. Lester Fox DMSSO Alexandria, VA Mr. Peter Pfeiffer DARCOM Alexandria, VA
(SG/I)	Sub-Group on Electronic/ Electrical Part	

PANEL NUMBER	TITLE	U.S. REPRESENTATIVE
AC/301 (Cont.)		
STG/1	Study Group on Analogue and Digital Servo Components	
STG/2	Study Group on Electric Connectors and Connections (for low frequency application)	
STG/3	Study Group on Semi-Conductor Devices and Micro-electronics	
STG/4	Study Group on Hybrid Micro-Circuits, Capacitors and Resistors	
STG/5	Study Group on Electrochemical Sources of Energy	
STG/6	Study Group on Electronic Modules	
STG/7	Study Group on Radio Frequency Transmission Lines	
STG/8	Study Group on Frequency Control Devices	
(SG/II)	Sub-Group on Mechanical Hardware Ad Hoc Working Party on Standardization of Vehicles Components	
STG/1	Study Group on Hardware	
(WP/1)	Working Party on Configuration Management	
PAPS	CNAD Ad Hoc Study Group on a Possible Periodic Armaments Planning System (PAPS) for NATO	CHAIRMAN: Mr. P.R. Calaway, Assistant for Program Planning (OUSDR&E/A(PP)), Office of the Under Secretary of Defense for Research & Engineering USREP: Cdr. J.A. Luper (see address under NMPA/SC)

NATO PROJECT STEERING COMMITTEES

PANEL NUMBER	TITLE	U.S. REPRESENTATIVE
SEASPARROW/SC	NATO SEASPARROW Steering Committee (BE, DE, GE, IT, NE, NO, US)	RADM C.J. Rorie Dep. Cmdr for Weapons Systems and Engineering Directorate (SEA-06) Naval Sea Systems Command Washington, D.C. US/NATO PM: Capt. O.E. Sanden Project Manager, NATO SEASPARROW Project (Code 00) NATO SEASPARROW Project Office Washington, D.C.
FORACS/SC	NATO Naval Forces Sensor and Weapons Accuracy Check Sites (FORACS) Steering Committee (DE, GE, GR, IT, NO, UK, US)	Chairman: Dr. H. Blood Naval Ocean Systems Center (Code 01) San Diego, Ca. U.S. REP: Dr. R.W. Sarvis Naval Ocean Systems Center San Diego, Ca.
NMPA/SC	NATO Maritime Patrol Aircraft Steering Committee (BE, FR, GE, IT, NE, US)	Cdr. J.A. Luper Armaments & Standardization Division U.S. Mission to NATO (USNATO) Brussels, Belgium
SEAGNAT/SC	NATO SEA GNAT Steering Committee (DE, GE, NO, UK, US)	Chairman: Capt. R. J. Raffaele Director, Systems Engineering and Integration Division (PMS-404-20) Anti-Ship Missile Defense Project Office Naval Sea Systems Command Washington, D.C. USREP: Capt. L.E. Pellock Project Manager, NATO SEAGNAT Project (NSGPO-00) NATO SEAGNAT Project Office Washington, D.C.
OTO MELARA/SC	Cooperative Support of the 76/62 OTO MELARA Compact Gun (DE, GE, GR, IT, NE, TU, US)	CDR W.L. Chadwick Surface Gun Systems Subgroup (SEA-62Y1) Surface Warfare Systems Group Weapons System & Engineering Directoral Naval Sea Systems Command Washington, D.C.

(5) Policy Guidance, Organization and Method of Work of the NNAG and its Subordinate Groups.

As of mid-1978, the NATO Naval Armament Group (NNAG) was the only one of the Main Armament Groups to have published a document spelling out how it was organized and operated. This NATO unclassified document (AC/259-D/513, AC/141-D324) is entitled "Policy Guidance, Organization and Method of Work of the NNAG and its Subordinate Groups." The following text is taken almost verbatim from the original, and should serve not only to clarify the workings of this particular Main Armament Group, but give the reader a good idea of how the others operate as well.

The methodology and guidance covered in this NNAG document stems from NATO Document, C-M(66)33 and was developed over the first decade of the NNAG's existence. Three Projects emanating from the NNAG during this period are covered in Chapter 8 (ASSM) and Chapter 10 (PHM and Seasparrow). Several more are mentioned later in this chapter under the NATO Industrial Advisory Group (NIAG).

The raison d'etre of the NNAG groups, is the promotion of improved equipment collaboration, leading to increased standardization and hence to increased effectiveness of NATO Naval forces. Although information exchange is important, representatives in the NNAG and its groups are to be capable of speaking with authority on operational concepts and national programs.[87]

(a) Coordination of Requirements - Method of Work

It is necessary to bear in mind that in translating needs into hardware, most navies have differing national procedures and legal requirements, but all generally entailing the approval of central Ministry and Parliamentary Committees, before even considering the implications of co-operative procurement. Further high level approval is generally necessary in proceeding stage-by-stage through the process to the introduction of the equipment into service, which from the first to the last step may span ten years or more.[88]

When preparing requirements, Naval Staffs are in varying degrees subject to the national disciplines of step-by-step processes. The basis for a co-operative program is an internationally agreed Operational Requirement, and a compatible timescale, or at least a requirement in which there is sufficient common ground on which to base a joint program. Such agreement is the NNAG's primary concern. Thus it is evident that agreement should be easier to reach if a process is adopted in the NNAG which takes account of the various requirements of national approval procedures so far as they are known.[89]

There are evident advantages in such a course of action. There is more chance of reaching Staff agreement if common needs and philosophies are identified at an early stage before nations become finally committed. NATO Military Authorities (NMAs) have full opportunities for exercising their right to give military advice and indicate long-term needs in the early stages when Outline NATO Operational Objectives are formulated. All nations in the NNAG have an opportunity to state preferences and constraints. There is also the advantage of numbers. It may prove easier to obtain political approval and funds for a

project if it can be shown that there is substantial NATO support for it. Also, with an orderly method of work, clearly stated objectives and a timetable, it should be possible to economize in attendance at NNAG sub-structure meetings and to increase the productivity of the NNAG.[90]

It will be seen that an identified common need is expressed as a draft Outline NATO Operational Objective, which on agreement in the national capitals ceases to be merely a draft. This should be followed by an evaluation of the options to answer the question "Where do we go from here?" After available national contributions to the problem, it should be possible to determine:

— If further aimed research is necessary.

— If it appears possible to arrive at an agreement on a NATO Operational Objective after obtaining the results of pre-feasibility and assessment studies.

— In some cases, it may be possible to proceed directly to agreement on a NATO Operational Requirement when utilizing another nation's developed equipment.[91]

(b) NNAG Direction

The timely and effective implementation of this process requires the NNAG to exercise particular direction of its groups, first in establishing to which projects the step-by-step process should immediately be applied, together with the timescale for the work; and secondly in keeping progress under close

review. The Alliance problems of co-operative procurement are not going to be solved overnight, and clearly the most pressing naval needs, and those which offer the greatest chance of success should be addressed first. NNAG representatives should therefore be in a position to state their most pressing needs, or those foreseen for the replacement of existing equipment for which they are prepared to seek co-operative procurement.[92]

Taking into account the military advice and priorities of the NMAs, the NNAG should aim to reach a collective judgment on the future equipments which should be first dealt with in this way and to direct the appropriate IEG accordingly. Such direction should be translated by the latter into precise terms of reference and a timetable for the task. Either the Pilot nation method could be used, or a sub-group formed, being charged to produce a draft Outline NATO Operational Objective. If no agreement can be reached the sub-group should be disbanded. If a draft Outline is achieved to which national approval is subsequently given, the IEG responsible should then evaluate the options for the next step and, subject to NNAG approval, interested nations would form a project group to implement it, using the Operational Objective as a basis for its work.

The application of the disciplined step-by-step method of work described below is designed to produce valid NATO Operational Requirements for projects designated by the NNAG. It should facilitate agreement on Requirements and initiate co-operative projects. It should expedite progress or speedily determine where none is possible. This methodology should be applied flexibly, according to the complexity of each project and the national proposals for it.[93]

(c) Organization and Definitions of NNAG Subgroupings.

(i) The Information Exchange Groups (IEGs) are permanent bodies in Brussels meeting several times a year for several days at a time with representation from all 13 NATO navies, the NATO Military Authorities (NMAs), other Main Armaments Groups and NATO Agencies as appropriate, and constitute the basic workshops for the NNAG. They are:

IEG/1 on Above-Surface Warfare;

IEG/2 on Under-Sea Warfare;

IEG/3 on Mines and Mine Countermeasures;

IEG/4 on Maritime Air;

IEG/5 on Tactical Control and Data Handling, and;

IEG/6 on Ship Design.[94]

Their terms of reference are based upon the responsibilities of the NNAG and, whilst the wording may vary depending upon the field of interest, the common task is basically to promote, through Information Exchange, co-operation in developing and producing equipment, preparing NATO Operational Requirements and the initiation of co-operative projects. During this process the IEGs take into consideration the NMAs' advice and recommendations including, in particular, evaluations of the future threat and assessments of NATO and national long-term equipment requirements. Particular attention is also given to the requirements of standardization or interoperability when considering future equipment development. To assist in information exchange, presentations on future equipment are given by industry, as appropriate (e.g. the Seasparrow Lightweight Missile System (SLMS) in September, 1979 for IEG/1). The IEGs are fully documented.[95]

(ii) A Sub-Group (SG) is established by an IEG, normally for a limited period, with the specific task of examining a particular subject clearly identified by the NNAG or the IEG as being an area which could possibly lead to collaborative research, development and production. Alternatively, a Sub-Group may be established to address a particular subject within the field of the parent body which has recognized the need for, and the possibility of, standardization or interoperability in this area, but which calls for concentrated study beyond the expertise of the parent group, would unduly burden its agenda, and requires the presence of additional specialist personnel at meetings. The Sub-Group is composed of operational and/or technical experts from the nations and representatives of the NMAs; reporting to the parent IEG. The work of a Sub-Group may result in the formulation of an Outline NATO Operational Objective and after the evaluation of the possible options and courses of action to realize the objective, the recommendation of the establishment of a Project Group entailing further aimed research, the consideration of an ongoing national program, or feasibility studies to establish a firm NATO Operational Requirement. Thirdly, their work could result in the preparation of NATO STANAGs. On completion of its task, the Sub-Group may be disbanded or placed in dormant status pending a further similar task. Sub-Groups are fully documented.[96]

(iii) A Special Working Group (SWG) is established by the NNAG to deal with a complex subject covering the field of interest of more than one IEG and requiring a variety of expertise. Its work may result in the formulation of one or more Outline NATO Operational Objectives and the recommendation for the establishment of one or more Project Groups. It

is usually composed of more senior operational and technical experts and NMAs' representatives, and normally reports directly to the NNAG. Its duration and status (active or dormant) are governed by the requirements of the problem. SWG's are also fully documented.

(iv) A <u>Project Group</u> (PG) is established by the NNAG as a result of a recommendation by an IEG or SWG who have concluded that an opportunity exists for two or more nations to proceed to co-operation in development/procurement of a system or equipment.

The aim of the Project Group is to establish the basis for such collaborative development/procurement. The Group has two stages during which it takes the appropriate actions to provide the necessary operational, technical and contractual documentation in sufficient detail to enable a final Memorandum of Understanding (MOU) to be signed by two or more governments to cover funding of the effort.[97]

In Stage 1 the Group is open-ended with representation from nations and NMAs. In this stage, which is normally unfunded, nations, after hearing further details of the proposal, clarify their national positions and decide whether or not to continue with the project.

Also in this stage the Group prepares a NATO Operational Objective, usually based upon the findings of one or more pre-feasibility studies conducted by NIAG or other industrial and/or governmental agencies. A Request for Proposals for Solutions or for a Feasibility Study and an MOU for such a study

are then prepared. The Management structure is also prepared. In Stage 1 the Group is fully documented.[98]

Stage 2 commences when two or more nations sign an MOU for a Feasibility Study or state their intent to commit funds and proceed towards development/procurement. During this stage the Group is composed of Engaged Nations. Should some nations retain a continuing interest but not be able at this point to commit themselves, they may be accorded observer status subject to certain principles agreed by the Engaged Nations.

The documents used in Stage 2 in preparing the technical specifications and the MOU are not circulated by NATO but are usually mailed directly between the Engaged Nations. Copies of such documents are forwarded to the NATO Naval Section.

General reports of the Group's activities and administrative notices are circulated as NATO documents.[99]

Upon signature of the Project Definition MOU or upon completion of Stage 2, the Group reports this fact to the NNAG who in turn request the CNAD to recognize the project as a NATO Project and establish a NATO Steering Committee and NATO Project Office. The Project Group is then disbanded.

(v) An Ad Hoc Working Group is an informal small group established within an IEG, SWG, SG or PG for a limited period and a specific task (such as preparing draft documents and working papers on a subject) on behalf of the parent body. It is not normally documented and much of its work may be conducted by correspondence between individuals.[100]

(d) Guidelines for NNAG Project Groups

As a guide to the NNAG subordinate groups, and based upon C-M(66)33 (2nd revised) the following procedures for Project Groups have evolved from the experience gained during the work of the NNAG. AC/141-D/324 emphasizes that these procedures are not rigid and that the principle of flexibility should be used in order to achieve the best results in each case.

It must be appreciated that each NATO Navy has a different process whereby permission by its appropriate authority is given for it to move to the next milestone or phase in the work of a Project Group. This procedure applies even before funding is required, since justification must be given to the national approving authority for any military requirement.[101]

For this reason, no effort is made in this document to specify the full step-by-step procedure which must be taken within nations from the moment that the possibility of a NATO project is first aired until a NATO Steering Committee for such a project is formed.

The steps outlined below merely indicate the sequence whereby NATO agreement is reached. It is assumed that, before each NATO step is agreed, the appropriate national approval has been given. NNAG terminology used in the Project Group sequence, to which the differing national terminology and decision milestones can readily be related, is explained in the attached Glossary.[102]

NATO Acquisition Process
NATO Naval Armament Group (NNAG)
(One of NATO's Six Main Armament Groups)

	Principals	Activity	
STAGE 1 (NORMALLY) UNFUNDED)	NNAG IEG[a]	DRAFTS OUTLINE OF NATO OPERATIONAL OBJECTIVE (OOO)	◄ OUTLINE NATO OPERATIONAL OBJECTIVE
	NNAG	INVITES INTERESTED NATIONS TO FORM PROJECT GROUP	
	CNAD[b]	INVITES NIAG TO ESTABLISH A SUBGROUP	
	NIAG	INVITES INTERESTED FIRMS TO PERFORM PREFEASIBILITY STUDY	
	NIAG SUBGROUP	SUBGROUP ESTABLISHED AND PREFEASIBILITY STUDY PERFORMED AND SUBMITTED TO PROJECT GROUP	
	PROJECT GROUP	DRAFTS NATO OPERATIONAL OBJECTIVE (OO)	◄ NATO OPERATIONAL OBJECTIVE
STAGE 2 (FUNDED)	PROJECT GROUP[c]	PREPARES RFP FOR FEASIBILITY STUDY, MOU FOR GOVERNMENTS, AND AGREES ON MANAGEMENT STRUCTURE	◄ MOU SIGNED FOR FEASIBILITY STUDY
	INDUSTRY(S)	FEASIBILITY STUDY PERFORMED	
	PROJECT GROUP	AGREES ON RULES FOR ASSESSMENT OF FEASIBILITY STUDY, EVALUATES IT, AND SUBMITS TO NATIONS FOR AGREEMENT	◄ NATO OPERATIONAL REQUIREMENT
	PROJECT GROUP	PREPARES MOU FOR PROJECT DEFINITION FOR DEVELOPMENT AND PRODUCTION	◄ MOU SIGNED FOR PROJECT DEFINITION
	PROJECT GROUP	TASK COMPLETED; PROJECT GROUP DISBANDED	
	NATIONS	ESTABLISH NATO PROJECT STEERING COMMITTEE AND PROJECT OFFICE	

◄ Milestones (two or more national governments approving/signing).

[a] Information Exchange Group.

[b] A prefeasibility study can be performed by (1) national government agencies and/or industries or (2) by NIAG subgroups. NIAG prefeasibility studies have been partially funded by NATO since 1975.

[c] Once the project group is in the funded stage, nonengaged (i.e., nonfunding) nations become nonvoting observers and must join within 1 year or drop out.

Sequence of Events

Step 1: Based upon national suggestions, a NATO Military Authority requirement, or examination of Replacement Schedules in an IEG, it becomes evident that a possibility exists for co-operative RD&P. A Sub-Group or Special Working Group may be formed to clarify the situation.
IEG

Step 2: The Sub-Group or Special Working Group, or the IEG itself, produces a Draft Outline NATO Operational Objective for a system.
IEG, SG or SWG

Step 3: National approval is given to this document which then becomes an Outline NATO Operational Objective and NNAG invites interested nations to form a Project Group in Stage 1 using this document as a basis for its work.[103]
NNAG

PG Stage 1

Step 4: The Project Group elaborates the contents of the Outline NATO Operational Objective and arrives at agreement on a NATO Operational Objective, based, if necessary, on the results of one or more Pre-feasibility Studies.

Step 5: The Project Group prepares a Request for Proposals for Solutions or for a Feasibility Study by Industry, and an MOU for such a Study. In addition, agreement is reached on a Management Structure.[104]

PG Stage 2

Step 6: Following any consultations with Industry considered necessary, the MOU is signed and the Project Group, consisting of signatory (engaged) nations, moves into Stage 2.

Step 7: Rules for assessment of the Feasibility Study results or the proposed Solutions are agreed. The Study results are evaluated and a NATO Operational Requirement is agreed.

Step 8: The Project Group Prepares an MOU for Project Definition. The MOU is signed.[105]

Step 9: The Project Group reports to the NNAG that its task is completed and that the engaged nations are ready to proceed in a collaborative project towards Project Definition for Development/Production. The Group is disbanded and a NATO Steering Committee and NATO Project Office (or in some cases an NPLO) are established. The Steering Committee makes annual progress reports to the CNAD and keeps the NNAG informed of progress at its meetings.[106]

Whilst the foregoing nine steps represent the classic outline for a Project Group's program in an "ab initio" project, it is sometimes the case that co-operative activities may take place around a system which may already be in the R&D stage within one country and other countries are invited to avail themselves of the benefit of work which has been done in that country, e.g. Seasparrow and PHM. Whatever form of co-operation may arise, the program of a

Project Group can be adapted to meet it with the proviso that when the expenditure of funds is involved, an MOU is usually required.[107]

An exception to this is when NIAG funds are expanded for a Pre-feasibility Study, since national funds are not directly involved but are controlled by the CNAD and NATO Civil Budget Committee, and consequently no MOU is needed. However, even though a Pre-feasibility Study may have to be funded by the Project Group nations, the Group remains in Stage 1 for this Study. Sometimes Pre-feasibility Study results may be offered without charge to the Project Group by a nation.

Nations who sign the MOU in Step 6 above are known as the Engaged Nations.[108]

At any time nations may decide to withdraw from the project, but without reimbursement of the money they may have spent earlier and subject to terms agreed in the MOU. Similarly, at any time nations may request to join the project on the understanding that they will pay to the currently Engaged Nations a share of earlier project costs, usually calculated as if that nation had been a member of the group of Engaged Nations in the project until that date in accordance with the provisions of the MOU.

The status of Observer Nation in Stage 2 of a project is governed by the wishes of the Engaged Nations. As general guidance, however, it has been the NATO policy to invite uncommitted nations to attend Stage 2 meetings in order to permit them to obtain further information on the activity of the Group, with the object of encouraging their full participation. In addition, uncommitted nations frequently have expertise to contribute to a project.

Observer Nations' suggestions, however, during the preparation of technical specifications, may or may not be used by the Project Group and, in any case, the Observer Nation has no vote in the decision-making process. If desired, when preparing final documentation for the project, the Engaged Nations can request Observer Nations to leave the meeting while sensitive matters are being discussed.[109]

(e) Glossary

(i) Outline NATO Operational Objective. A broad listing of the Operational Characteristics required of the system. The document contains Operational Characteristics, details of the Threat, desired capability and a general indication of size and cost limitations (if possible). Sufficient detail is given to enable one or more Pre-feasibility Studies to be carried out.[110]

(ii) Prefeasibility Study. A Pre-feasibility Study indicates whether or not the Outline NATO Operational Objective merits a deeper Feasibility Study. It is conducted either by NIAG or by industry and/or government agencies if NIAG is not in a position to do so, to examine the proposal, assess the trade-off points and make a broad assessment of the practicable alternatives and also the penalties involved in adopting certain courses of action. The Study should, so far as possible, establish the feasibility of suitable solutions consistent with the timescale of the Study, identify problem areas and recommend the form and direction of the next phase.[111]

(iii) NATO Operational Objective. Based upon paragraph 2 above on the findings of any Pre-feasibility Studies, the NATO Operational Objective lists, in greater detail, Operational Characteristics and certain Technical Specifications which are desired and which have been shown to be broadly feasible. This document is used as a basis for the Request for Proposals from Industry for a Solution or for a Feasibility Study of the system.[112]

(iv) Feasibility Study. A Feasibilty Study is carried out by Industry or Government Agencies or a combination of both with the object of providing a technical appraisal of the feasibility of developing and producing an equipment with the performance required by the NATO Operational Objective. The Study identifies areas of technical risk, recommends characteristics of the system(s) and gives the optimum balance between performance, cost and development time. The Study also indicates areas where considerable advances on the existing state of knowledge are likely to prove necessary for successful development. It indicates the means by which the recommended solution will be achieved, suggests a program for Project Definition, Development and Production, with a preliminary estimate of the costs for these phases.[113]

(v) NATO Operational Requirement. This document represents the results of the refinements of the NATO Operational Objective as a result of an agreement upon trade-offs between Feasibility, Cost, Operational Needs and National Requirements and taking into consideration the NMAs' advice and recommendations. It represents the final specification of the system upon which Project Definition is based.

(vi) Project Definition. Is the process of examining more deeply all the aspects of the proposed project. It is used to explore the areas of high technical uncertainty and to evolve detailed specifications. One of the main purposes of Project Definition is to explore the possible trade-offs between performance, time and cost and to establish a satisfactory balance between them. The resulting comprehensive specifications will form the basis of more detailed and realistic estimates of development, time and cost and for the discussion on whether to proceed with development to completion.

During Project Definition a detailed development program is prepared, together with development cost estimates.

As a result of Project Definition, a Performance Specification and Engineering Characteristics Specification are produced.

Upon completion of Project Definition, a Development MOU is prepared.

(vii) Request for Proposal (RFP). The RFP is a co-operatively-funded formal invitation to Industry to submit proposals for the conduct of a Feasibility Study, Project Definition, System Development or Production. Depending upon the particular stage involved, the document usually includes headings dealing with Timescale for Response, Authorities involved, Conditions, Management of Work, Details of Outputs required, Costs, Technical Specifications, etc.[114]

(viii) Memorandum of Understanding (MOU). An MOU is a written arrangement or understanding between Governments setting forth the terms under which they will co-operate in the performance of certain work such as Research, Development or Production. The MOU usually sets forth, in broad terms, the Objectives of the program, the work to be performed by each participant and its financing, the rights to technical data and patents to be acquired, and other necessary elements concerned with the administration and performance of the program.

(ix) Standardization. Standardization is the Process by which member nations achieve the closest practicable co-operation among forces, the most efficient use of research, development and production resources, and agree to ădopt on the broadest possible basis the use of:

- Common or compatible operational, administrative and logistic procedures.

- Common or compatible technical procedures and criteria.

- Common, compatible or interchangeable supplies; components, weapons, or equipment.

- Common or compatible tactical doctrine with corresponding organizational compatibility.[115]

(x) Compatibility. Compatibility is the capability of two or more items or components of equipment or material to exist or function in the same system or environment without mutual interference.

(xi) Interchangeability. A condition which exists when two or more items possess such functional and physical characteristics as to be equivalent in performance and durability, and are capable of being exchanged one for the other without alteration of the items themselves, or of adjoining items, except for adjustment, and without selection for fit and performance.

(xii) Interoperability. The ability of systems, units or forces to provide services to and accept services from other systems, units or forces and to use the services so exchanged to enable them to operate effectively together.[116]

c. Several Key NATO and NATO Related Bodies and Recent Initiatives

(1) NATO Production and Logistics Organization (NPLO's)

With the acceleration of international collaborative efforts among the Alliance members which began around 1957, NATO began formulating a more systematic method of categorizing the various enterprises underway. Not only were there a number of infrastructure construction programs such as pipeline, airfield, and communications networks going on, but on the weapon system side there was a growing number of programs, such as the G-91 LWSR Aircraft, the HAWK, Sidewinder, and Bullpup missiles, the Atlantic, and the F-104G Star-

fighter. Added to these were a large number of standardization programs for smaller weapons, ammunition, and logistical material. Also, there was a growing network of logistic support activities for many of the programs completed, or in being.

One side effect of these multiple efforts in construction, development, production, operation, or logistical support, was a proliferation of multinational production agencies and management organizations, each working independently, under different terms of reference, and generally responsible to different groupings of participating nations.[117]

Many of these organizations did not require a special charter as they operated either through existing national agencies or on NATO's Military Command side, enjoyed the status granted to such outfits as SHAPE. On the civil side of NATO, though, a definition and extension of the special status of NATO's Headquarters to all subsidiary agencies, was an open issue.

In an effort to control and standardize the missions, organization, and functioning of these civil agencies and clarify their legal status, the NATO Council announced a policy in early 1962 of establishing them as NATO Production and Logistics Organizations (NPLO's). Included in this grouping (with their eventual formal Alliance designations) are the organizations listed below:

Logistics Support:

- The Central European Operating Authority (CEOA) - established in 1957, and;[118]

- The NATO Maintenance and Supply Organization (NAMSO) - established in 1958.[118]

Weapon Systems:

- The NATO Hawk Production and Logistics Organization (NHPLO) - established in 1959;[119]

- The NATO Sidewinder Production Organization - established in 1959 and liquidated circa 1966;[120]

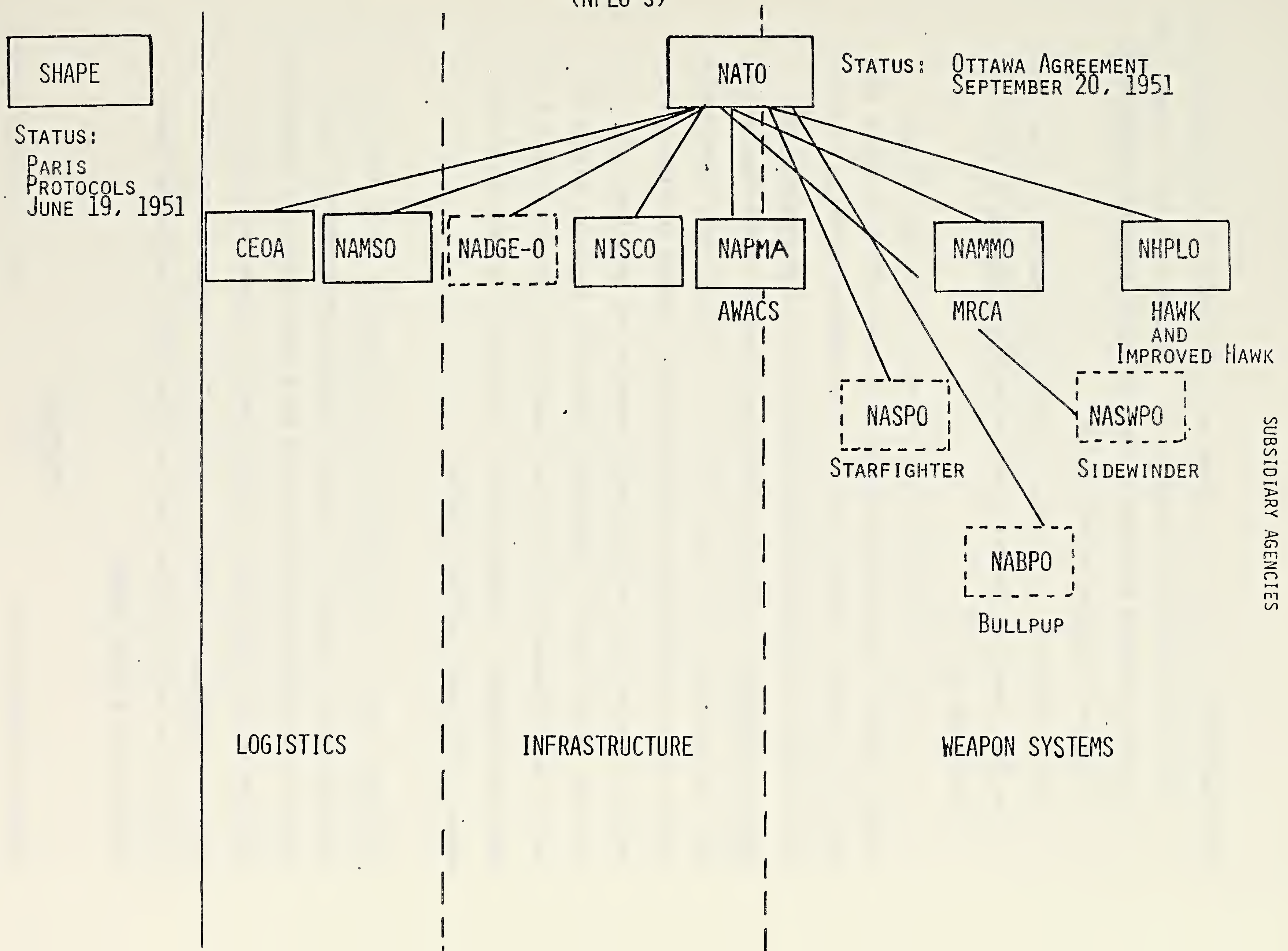
- The NATO F-104G Starfighter Production Organization (NASPO) - established in 1961 and liquidated circa 1966;[120]

- The NATO Bullpup Production Organization - established in 1961 and liquidated circa 1966;[120]

- The NATO MRCA Management Organization (NAMMO) - established in 1969, and;[121]

- The NATO AEW&C Project Management Organization (NAPMO) - established in 1978.[122]

NATO PRODUCTION AND LOGISTICS ORGANIZATIONS (NPLO's)



Infrastructure:

- The NATO Air Defense Ground Environment (NADGE) Organization -established in 1965 and liquidated in 1977, and;[122]

- The NATO Integrated Communications System (NICS) Organization - established 1971.[122]

In early 1962 NATO had produced a 24-page model charter for all existing and future semi-autonomous subsidiary bodies of NATO (NPLO's), entitled "Regulations for NATO Production and Logistics Organizations," NATO Unclassified Document, C-M(62)18.[123] To comply with the new policy of standardization the NPLO's revised their charters to provide for: a uniform type of organization (to the extent possible under differing missions); standard administrative, financial, and personnel policies; and a reporting and operating channel to the North Atlantic Council. These NPLO's share NATO's juridical personality and all the concommitant privileges and immunities by virtue of Article 4 of the Ottawa Agreement. Included therein is immunity of jurisdiction and the waiver of all taxes, tariffs and duties.

Among other things, it also provided for the lessening of the strictures of unamity by making it easier for several like minded member nations to join together in non-comprehensive enterprises for a given project. A synopsis of the painfully slow evolution of attitudes over the 8 years preceeding the issuance of C-M(62)18 is covered in Chapters 4 and 7 under the two key projects: the Central European Pipeline System (CEPS); and the NATO Hawk surface-to-air missile system.

Only the North Atlantic Council (NAC) can establish or dissolve an NPLO and grant, amend or revoke its Charter. The NAC grants an NPLO within the scope of its functions, authority to:

- conclude agreements and contracts, and acquire and dispose of property in the name of NATO.

- conclude administrative agreements with other NATO bodies.

All assets acquired by an NPLO are acquired in the name of and as the property of NATO. However the NPLO members exercise all rights enjoyed by NATO.

The total cumulative share of each member state in an NPLO is expressed as a percentage. Responsibility for the activities of the NPLO's, including any agreement or contract concluded is borne by NATO. However, within NATO, the member states of the NPLO jointly assume this responsibility vis-a-vis NATO, and bear any resulting cost collectively in proportion to their financial contributions. An NPLO is comprised of a number of sovereign nations. If one among them refuses to fund its share of a contract signed by the NPLO with a third party, it is the responsibility of the other member nations to cover the defaulting nation's share. Legally speaking, there are only two contracting parties.[124] Organizationally, NPLO's are composed as follows:

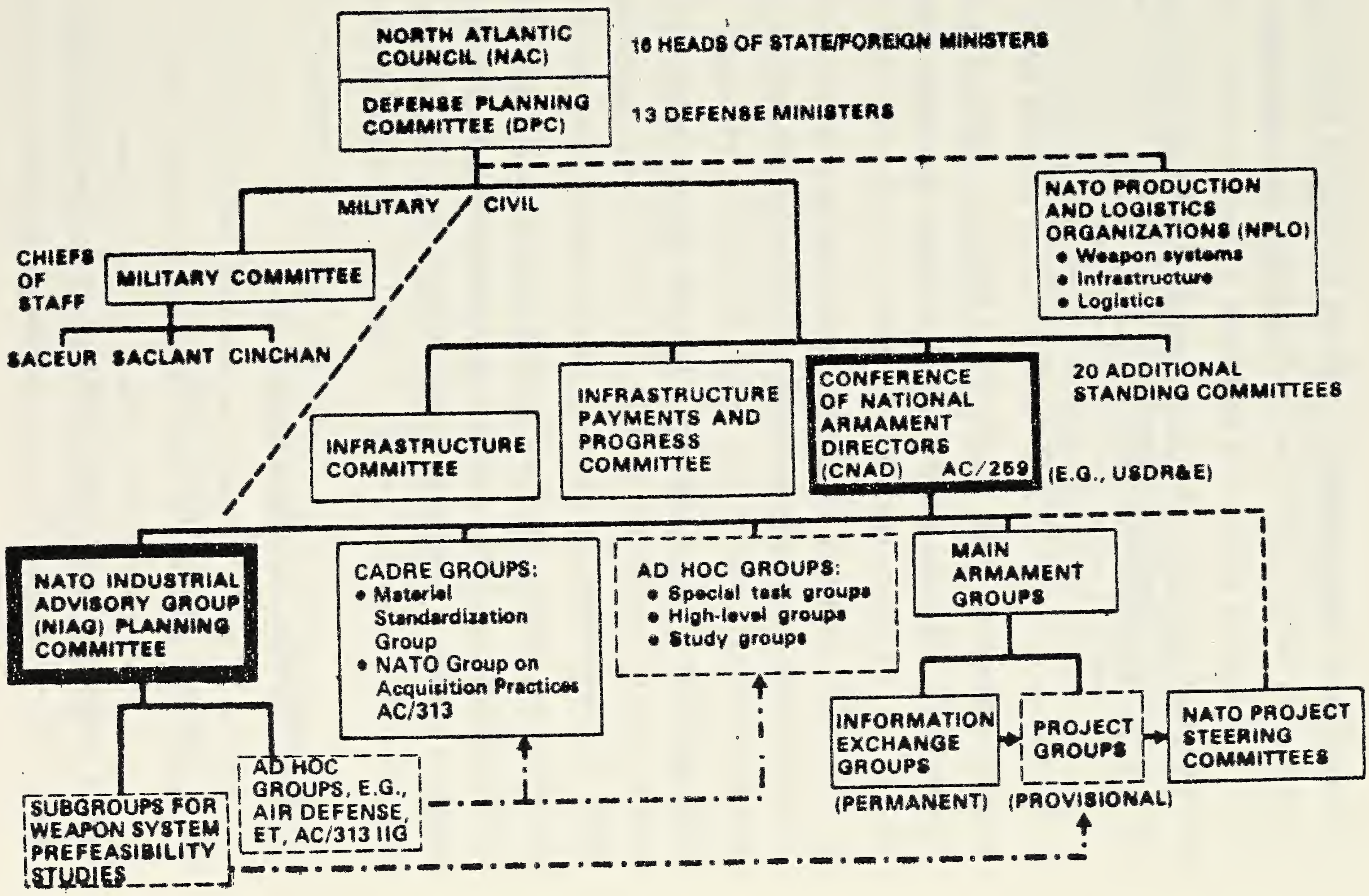
— a Board of Directors (BOD), composed of one representative of each state which is a member of the given NPLO with each such state having the right to one vote, and;

— an Executive Body, composed of a General Manager (directly responsible to and selected by the BOD) and his staff.

Details concerning the organization, authority, decision making, responsibilities, and manning of the BOD and Executive Body components along with financial management are spelled out in C-M(62)18.

Security matters and audit are also covered in C-M(62)18. In the area of security NPLOs are bound by the general security rules set out in

Conference of National Armament Directors (CNAD) and NIAG



C-M(55)15(Final), dated October 31, 1958 and are required to set up an Industrial Security Section within the Executive Body which comes under the control of the NATO Security Bureau. The NATO Board of Auditors, acting on behalf of the North Atlantic Council, audits the account of all NPLO's (see Chapter 2 for more on the NATO Board of Auditors).

As NPLOs share in NATO's juridical personality, and therefore NATO's immunity, a special arbitration clause is provided in Annex I to C-M(66)18 which is inserted in all contracts signed by the NPLO through its General Manager.[125] The NPLO and contractor either jointly appoint an arbitrator within 30 days, or, if not, the dispute is submitted to an arbitration Tribunal consisting of three arbitrators; one appointed by each of the two parties and the third (who acts as President of the Tribunal) jointly by these two arbitrators. If the above appointments are not completed within the alloted time period of 15 days for the first two arbitrators or 30 days for the President of the Tribunal, NATO's Secretary General will make the necessary appointments within 21 days. The Arbitration Tribunal makes its decision by majority vote and, unless it decides otherwise, follows the arbitration procedures of the International Chamber of Commerce. The awards of the arbitrator or of the Arbitration Tribunal are final and there is no right of appeal or recourse of any kind.

(2) <u>The NATO Industrial Advisory Group (NIAG)</u>

(a) An Industrial Advisory Group within NATO

The NATO Industrial Advisory Group (NIAG) was established by the CNAD in October 1968 with the decision being subsequently endorsed by the North

Atlantic Council (NAC) in December. The first plenary meeting of NIAG was held the following month in January, 1969.

> The objectives of the NIAG are to provide a forum for free exchange of views on the various industrial aspects of NATO armaments questions, to foster a deeper feeling of international involvement in research, development and production, to seek closer co-operation amongst the industries of member countries, and to encourage the timely and efficient exchange of information between member governments and their defense industries.126

Lacking any real precedent, principles and procedures had to be worked out prior to the commencement of its practical work. The principles included:

- Adoption of a moral code that nothing said during discussions could be used against the firm under existing conditions of competition;
- NIAG delegations represented their national industries as a whole and not individual firms;
- A national NIAG delegation does not necessarily represent the view of its government (even though the development of close liaison between NIAG representatives and their government was to be expected).

NIAG's work falls primarily into two categories:

- It has participated in the discussion and study of a number of problem areas of common interest to industry, as well as government. Important among these have been the issue of Industrial Property Rights treated later in this chapter vis-a-vis one of its governmental counterparts, AC-94;

- NIAG also does work on particular equipment projects or requirements which have been passed to it for advice.

The establishment of such a group of industralists was greeted with some initial hesitation and even suspicion in some quarters, but the ability and enthusiasm with which it has set about its work has already demonstrated the value of this initiative, and the work which as already been accomplished testifies that NIAG has become a powerful aid in NATO's cooperative equipment endeavours.127

NIAG, as the industrial organization for NATO affairs, reports to the Conference of National Armament Directors (CNAD). CNAD stands for the Conference of National Armaments Directors and is one of the 20-plus standing committees under the North Atlantic Council. The U.S. representative to CNAD is DDR&E (or more recently Under Secretary of Defense for Research and Engineering (USDR&E)), a post currently being filled by Bill Perry.

On the civil side of NATO, it is in these committees of national representatives and their subordinate groups that decisions are made. The international staff/secretariat has a corresponding organization, and supports this process.

Procedures also had to be established, for the communication of classified information between NIAG and the CNAD and its subordinate bodies within the terms of NATO security regulations.

(b) <u>The NIAG Planning Committee</u>

NIAG is an official organization run on a rather informal basis whose planning committee interfaces with NATO through CNAD. The planning committee meets three times a year in Brussels while overseeing the activities of its various subgroups and ad hoc groups. Worthy of note is the fact that France is a very active participant.

For NIAG's planning committee each national industrial delegation provides several representatives at their firms' own expense. Representatives now serve for four years, and the chairmanship and vice-chairmanship is rotated. A Mr. Willegens of the Netherlands, who was the Chairman of the NIAG Planning Committee during 1980 will serve another term in 1981. A Canadian, either Mr. Ernie Wall or Vic Simons, will be Vice Chairman. A secretariat is provided by the NATO International Staff.

The U.S. delegation to the NIAG planning committee consists of seven U.S. delegates selected by four U.S. industry associations: the ADPA; the AIA; the NSIA; and the EIA. The associations solicit member firms for nominations, each association selecting one representative, with the remaining three selected through collective informal coordination. The associations review nominees and submit their final selection to USDR&E for final approval and appointment. The U.S. delegates are officially designated by DoD orders and must receive a DoD and NATO secret security clearance. The delegation meets with USDR&E prior to each meeting, receiving guidance, and then debriefs him after each. The chairmanship of the U.S. delegation is rotated annually while

the time required for each member is three 1-week periods a year, plus any voluntary additional time.

Membership of U.S. Delegation to the NIAG Planning Committee as of January, 1980, was as follows:

	Designator	Expiration of Term
Otto J. Glasser (Chairman, General Dynamics Corporation Corporate V.P., International, Washington	At large	Dec. 80
Dr. Leonard Gross Hughes Aircraft Company V.P., Assistant Group Executive Engineer Aerospace Group	AIA	Dec. 81
Clyde A. Parton Honeywell, Inc. Group V.P., Aerospace and Defense Group	ADPA	Dec. 82
Robert A. Fisette Martin Marietta International, Inc. V.P.	At Large- Brussels	Sep. 83
Philip S. Devirian FMC, Corporation V.P.	At Large	Dec. 80
Jesse R. Lien	EIA	Dec. 81

Membership of U.S. Delegation (Cont'd)

	Designator	Expiration of Term
GTE Laboratories, Inc., President		
Forbes (Ted) Mann[128] The LTV Corporation Senior V.P.	NSIA	Dec. 81

Selection criteria for the U.S. delegation to NIAG planning committee are: involvement in NATO affairs; involvement in industrial association(s); commitment to participate actively in NIAG; being a senior manager in a major U.S. defense firm (V.P. or higher); and the need to rotate seats among firms to provide for broad participation.

NIAG
and the
NATO Acquisition Process

			Stage 1 (normally unfunded)				Stage 2 (funded)					
Principals	NNAG Information Exchange Group (IEG)	NNAG	CNAD*	NIAG	NIAG SubGroup	Project Group	Project Group**	Industry(s)	Project Group	Project Group	Project Group	Nations
Activity	Drafts Outline of NATO Operational Objective (OOO)	Invites Interested Nations to Form Project Group	Invites NIAG to Establish Subgroup	Invites Interested Firms to Perform Pre-feasibility Study	Subgroup Established and Pre-feasibility Study Performed and Submitted to Project Group	Drafts NATO Operational Objective (OO)	Prepares RFP for Feasibility Study, MOU for Governments and Agrees on Management Structure	Feasibility Study Performed	Agrees on Rules for Assessment of Feasibility Study, Evaluates it, and Submits to Nations for Agreement.	Prepares MOU for Project Definition for Development and Production	Task Completed; Project Group Disbanded	Establish NATO Project Steering Committee and Project Office

▲ Outline NATO Operational Objective

▲ NATO Operational Objective

▲ MOU Signed for Feasibility Study

▲ NATO Operational Requirement

▲ MOU Signed for Project Definition

▲ *Milestones (two or more national governments approving and signing)*

* *A pre-feasibility study can be performed by (1) national government agencies and/or industries or (2) by NIAG subgroups. NIAG pre-feasibility studies have been partially funded by NATO since 1975.*

** *Once the project group is in the funded stage, nonengaged (i.e. non-funding) nations become nonvoting observers and must join within 1 year or drop out.*

For subgroups and ad hoc groups the selection criteria is simply one of, "if the firms are willing to foot the bill, they are welcome to participate."

(c) NIAG Subgroups and Prefeasibility Studies

As a major input toward coming up with a NATO operational objective, a NIAG subgroup is sometimes asked to perform a pre-feasibility study based on an outline NATO operational objective (OOO) previously drawn up by one of the Main Armament Group's permanent Information Exchange Groups (IEG's) and approved by two or more nations. The task is accomplished by the pre-feasibility study is to:

> Examine the proposal, assess the trade-off points and make a broad assessment of the practicable alternatives and also the penalties involved in adopting certain courses of action. The study should, so far as possible, establish the feasibility of suitable solutions consistent with the time scale of the study, identify problem areas and recommend the form and direction of the next phase.

NIAG pre-feasibility studies are partially funded by the NATO civil budget since 1975. The seven pre-feasibility studies performed between 1975 and 1980 have involved NIAG contracts amounting to one-half to three-quarters of a million dollars each, with the balance absorbed by the participants. This has involved sub-groups 8 through 12 plus phases II and III under sub-group 6.

The results of the pre-feasibility studies are eventually translated into NATO Operational Objectives (OO) by the relevant major Armanent Groups, if two or more nations approve them.

There have been 12 NIAG subgroups between 1968-1980:[129]

SUBGROUP NUMBER	OUTLINE NATO OPERATIONAL OBJECTIVE
1	Advanced Landing Systems
2	Battlefield Land Target Detection
3	Expendable Targets
4	Low Angle Radar Tracking
5	Identification of Maritime Surface Targets
6	Compatability of Naval Data Handling Equipment
7	Multi-Functional Radar
8	Second Generation Anti-Ship Missile

SUBGROUP NUMBER	OUTLINE NATO OPERATIONAL OBJECTIVE
9	Small Surface-to-Air Self-Defense Weapon System "6S"
10	Air-to-Air Missiles
11	Off-Board Soft Weapon System
12	Family of Air-Launched Missiles

Listed below are the five most recently established subgroups with their CNAD subordinate group counterparts:

System	NIAG Subgroups	Estab-lished	CNAD Counterpart
2nd Generation Anti-Ship Missile	NIAG SG/8	1975	NNAGPG/16[130]
Small Surface-to-Air Ship Self-Defense Weapon System	NIAG SG/9	1976	NNAG PG/17

System	NIAG Subgroups	Established	CNAD Counterpart
Air-to-Air Missiles	NIAG SG/10	1978	NAFAG SG/13
Off-Board Soft Weapon System (Anti-Missile)	NIAG SG/11	1979	NNAG PG/24
Family of Air-Launched Missiles	NIAG SG/12	1979	NAFAG SG/9

The chart on the next page shows roughly how industry fits into NATO procedures for cooperation in R&D and production through NIAG pre-feasibility studies. Specifically, how it participates in the formulation of a NATO operational objective, which in turn, if two or more nations continue to be interested, can lead to a feasibility study and the formulation of a NATO operational requirement, followed by an MOU among engaged governments for project definition.

CNAD's project groups usually last from 1-5 years, whereas NIAG's counterpart subgroups are usually dissolved within 6 months to a year. Once the NIAG subgroups functions have been completed, the two or more engaged nations continue with the project on their own, working out collectively arrangements with their own industries.

Since its inception in the mid-70's NIAG Sub-Group 6 for Compatibility of Naval Data Handling Equipment, has been spear heading NATO's efforts towards the establishing broad-based interoperable specifications that would allow a mix of U.S. and European system elements on the ships of NATO member navies.

Operating within Sub-Group 6, Phase III, Sperry-Univac and Thomson-CSF completed technical tests in early 1980 of high-speed data transmission between French and American computers. They utilized NATO Standardization Agreement (STANAG) 4153 which had been developed by SG/6 and has since been ratified by the U.S. and French navies. This was but one of a series of initiatives to obtain increased naval combat system equipment interoperability, in which Sub-Group 6 has been involved.

As part of the same effort an intra-ship fiber optics digital data link was first demonstrated using an interoperable mix of U.S. and European system elements.

The transmission equipment used consisted of prototype systems constructed independently by Rockwell International and France's Thomson-CSF. Various equipment mixes showed the interface requirements can be met by state-of-the-art emitters, detectors and fiber optics cables.

The demonstration was held at Rockwell International's Marine Systems Div. in Anaheim, California.[131]

The draft specification for a standardized and interoperable fiber optics link is being presented to naval authorities in all NATO countries for consideration as a NATO STANAG. It is being recommended as an affordable and practical fiber optics interface that will insure interoperable data links with considerable flexibility in choice of components and usage.

Representing over 20 NATO industrial firms from 10 countries, Sub-Group 6's members say the proposed fiber optics data link resolves the problem of finding a specification that can be implemented for equipment and materials common to all NATO countries.

Another pre-feasibility study, one pertaining to NIAG Sub-Group 8, was organized in 1976 to work with the NATO Naval Armaments Group's (NNAG) Project Group 16 for the second generation Anti-Surface Ship Missile (ASSM). NATO provided 15 million Belgian Francs. This project is covered in detail in Chapter 8.

The pre-feasibility study on the NATO "6S" systems was performed by NIAG Sub-Group 9 which included British, German, Italian, French, Dutch, Norwegian and Danish firms (in declining order of man-days expended by each). NIAG Sub-Group 9's corresponding group on the governmental side was the NATO Naval Armaments Group (NNAG) Project Group 17. The funds allocated to the study—15 billion Belgian Francs (about ½ million dollars)—by NATO were apportioned to the participating companies in proportion to the man-days of effort expended, as certified by their national focal point.

NIAG subgroup 10 resulted in a flap. There was supposed to be a two-part effort, but when Phase I was completed in late 1978--involving some 400 people from industry--CNAD said, "thanks, we'll finish it ourselves," and cancelled Phase II.

In NATO's 1979 Civil Budget contract authority was approved for an amount of 45 million Belgian francs for two pre-feasibility studies on:

A NATO Off-Board Soft Weapon System (or systems) for anti-ship missile defense for NNAG Project Group 24 (B. fr. 20 million), and;

A family of air launched weapons which includes short, medium, and long range missiles, for NAFAG Sub-Group 9 (B. fr. 25 million).

NIAG Sub-Group 11 (SG/11) was set up in October, 1979 after the April 1979 meeting of the CNAD at which NIAG was invited to undertake a pre-feasibility study on a NATO Off-Board Soft Weapon System (or systems) for anti-ship missile defense. The pre-feasibility study was based on the outline NATO operational objective (OOO) previously drafted by NNAG Project Group 24. This was followed by a meeting of an ad hoc group of NIAG representatives in June that prepared proposals for an organizational structure, a program of work, and a timetable.

The proposals were subsequently discussed and finalized at a July meeting. At another meeting, in September, a cost estimate was prepared.[133]

FOXC/Disk 955/Ch.5,p.95 and on

The organization of SG/11 consists of a Steering Committee, an Administration Group, and six technical teams.

The first task was to develop a data base and, secondly, assess requirements for systems to be developed. The data became very rapidly highly classified because of ships' signatures.

The report was submitted in June 1980 and Group was disbanded in October 1980. The report was not made available to U.S. study group members. But, for U.S. firms, it could be obtained "with a need to know" from the U.S. DOD Documentation Center. It was reported that Navy Sub-Group 24 did not provide adequate guidance to the study group. Mr. W. Kinsman (Canada), the NATO Naval Weapons Section leader (International Staff), supported the group.

NIAG Sub-Group 12 was set up to undertake a pre-feasibility study based on NAFAG Sub-Group 9's outline NATO operational objective (OOO) for the family of air launched weapons. Firms from seven national industries are participating in the study—France, U.K., FRG, and the US having major roles, Italy a minor role, and Belgium and the Netherlands participating as observers. The organization of SG/12 involves a Steering Committee, and a number of technical teams.

In NIAG SG/12 there are 83 firms participating in the one-year study, 25 of which are from the U.S. This includes some 273 representatives from the 7 nations.

For this project this has involved principally U.S. firms trying to direct the study along lines close to their own projects, while learning how the Europeans view the mission requirement. One Boeing participant placed the number of manhours required of each of his firm's three participants at 40 hrs. a month. The project found itself continually plagued with handling of classified data. The final report was submitted to NAFAG Sub-Group 9 in December 1980.

It was estimated that the B. fr. 25 million provided by NATO for the study covered about 1/3 of the total expenses incurred by the participants. One Boeing representative felt that the participants were not only willing, but in spite of their numbers, well controlled. He felt strongly that there should never be an attempt to limit the number of companies/people participating in such NIAG Sub-groups.

NIAG funding of pre-feasibility studies was to come to only B. fr. 35 million for 1981, 10 million less than for the previous year.

NNAG, Project 27 requested NIAG to conduct a feasibility study on a NATO frigate replacement. There was an organizational meeting in October 1980 and the study was to begin in February 1981. There is a document AC/141-D/280 (4) which defines the operational requirements (considered a major operational breakthrough). A second portion of the study will consider a helicopter. The study will be headed by a Canadian Captain. Mr. Kinsman of the NATO Naval Weapons Section will provide NATO International Staff support.

(d) NIAG Ad Hoc Groups

All of NIAG's other subordinate groups are called ad hoc groups. Five NIAG ad hoc groups that have been active over the last several years are:

- Industrial Property Rights;
- Air Defense;[134]
- Long Range Stand-off Missile;
- Problems related to Standardization and Interoperability of Military Equipment, and;
- Contract Clauses.

NIAG's Ad Hoc Group on Industrial Property Rights has been working with one of CNAD's cadre groups, AC/94, the Working Group on Industrial Property. Three of their joint products are listed here:

- "Comparative study on national law, policy, and regulations concerning procurement of defense material in which industrial property matters are involved." Notice AC/94-N/136, and NIAG (76)N/4, December 6, 1976.

- "Intellectual property principles and guidelines in the field of licensing and coproduction for the purpose of armaments standardization or interoperability." Document AC/259-D/7000, AC/94-D/283, and NIAG (79)D/1, August 16, 1979.

- Drafting international cooperative research and development agreements.

In October 1980 a NIAG Ad Hoc Group on Contract Clauses was convened in Brussels. Though the immediate preoccupation of the group appeared to be a balance of 'juste retour' and competitive selection considerations for the upcoming multi-billion dollar ACCS effort, the group's formal objectives lay elsewhere. The short term objective is to develop standard clauses to be incorporated in MOUs, contracts, and subcontracts while the longer range goal was to write a NATO "ASPR."

(e) Recent Initiatives to Improve NIAG's Effectiveness

To date NIAG's effectiveness has been very limited. However, at the NATO level, as of early 1980, CNAD has recently been acting upon NIAG criticism of non-responsiveness. John Stone (NATO International Staff) of the Defense Support Division, was tasked in September 1980 to draw-up guidelines which were to institutionalize interfaces between NATO Armament Groups and NIAG Study Groups.

At the U.S. level, the U.S. Delegation and the DOD have also recently begun to clear up log-jams in the flow of data to U.S. defense firms. In the past U.S. firms have only been able to obtain classified data from the DOD after several weeks, whereas European firms get it in several days. Additionally, when data is released, it's distribution from the U.S. Delegation, to the industrial associations, and on to U.S. firms is often inadequate.

Recent U.S. initiatives as of spring 1980 include:

- the USDR&E, the U.S. NIAG delegation, and the industry associations working to clear up data flow problems;
- an on-going effort to improve U.S. mission, U.S. NADREP (USDR&E), and U.S. NIAG delegation communication;
- the DOD striving to increase NIAG inputs and activity, and;
- the recent addition of a seventh U.S. representative as a permanent Brussels man in order to assure adequate notice for meetings.

(3) The Military Agency for Standardization (MAS) and NATO Standardization Agreements (STANAGS)

The Military Agency for Standardization (MAS) was set up in 1951 in London to foster military standardization among NATO members, and thereby more effective interoperability. This includes both procedures and materiel (e.g. minor equipment assemblies, and components but not major weapon systems). In 1970 the MAS was transferred to Brussels.

Groups of international technical experts supported by the international military staff (IMS) and in coordination with CNAD's subordinate groups, draw up draft Standardization Agreements (STANAG's), which, after one or more review and comment cycles, are promulgated by the MAS Chairman. The Chairman is directly responsible to NATO's Military Committee. Under the Chairman are three boards, one representing each armed service. Once promulgated STANAG's must be ratified by the various member nations individually. This takes time,

and often no more than several nations ever do ratify many of the the STANAG's. As of 1980 there were over 800 STANAG's.[135]

In addition to enhancing the interoperability of NATO forces through greater commonality of operational procedures and material, NATO STANAG's also bring about certain economies in design, engineering, development, procurement, production and supply. About ½ of the existing 800 NATO STANAG's pertain to materiel. A broad base of materiel STANAGS would provide a foundation for greater rationalization of NATO logistics through increased commonality in such areas as fuels, ammunition, components, spare parts and materials.

Recent studies in the materiel area have singled out deficiencies in the NATO STANAG system.

> The number of materiel STANAG's is insufficient to support the materiel needs of a 15-nation alliance. Many existing STANAG's are not ratified (agreed upon) by the United States and other Allied nations because they cover subjects of little or no interest (such as 9mm ammunition) or because the STANAG covers items and practices not currently used. Many STANAG's do not require the retrofit or modification of existing equipment and apply only to newly procured equipment (for example, over 90% of the materiel STANAG's used by NATO Air Forces contain "no retrofit" clauses).136

The allies have also been looking toward increased emphasis on incorporating other related military international standardization programs into the NATO program. Such international programs as the American/British/Canadian/Australian (ABCA) Armies, the ABCA Navies, and the Air Standardization Coordinating Committee (ASCC) have been under consideration for increased use in NATO STANAG development.[135] (See page 108 for recent initiatives of NATO's Group on Materiel Standardization, AC/301, in this area.)

(4) Three of NATO's Cadre Groups, AC/94, AC/301, and AC/313

(a) AC/94 and AC/313

Among the several Cadre groups under the CNAD there is the Working Group on Intellectual Property (AC/94).[137] AC/94 was first set up in 1955. As with the other NATO Working Groups the members of AC/94 are the experts sent by the national governments (including a chairman) plus a permanent secretary supplied by the Industrial Property Section, of the Defense Support Division of NATO's International Staff/Secretariat in Brussels. The secretary's responsibilities in such a grouping entails the not inconsiderable task of supporting the national representatives in their efforts and to eventually reach a consensus that can be assimilated and drafted into one common document.

Under the direction of CNAD (AC/259), NATO's Working Group on Industrial Property (AC/94) has published the following:

NATO Agreement on the Communication of Technical Information for Defense Purposes, April, 1971;

Guidance to NATO Procurement Authorities, Document AC-259-D/374 and AC/94-D/244, March 25, 1974;

Supplementary Report on National Practices Regarding Proprietary Rights in Cooperative Research and Development Programmes, Notice NIAG (75)N/5, July 14, 1975;

Regulations in NATO Countries Concerning Employees' Inventions, Notice NIAG (76)N/1, January 30, 1976;

Comparative Study on National Law, Policy, and Regulations concerning procurement of Defense Material in which Industrial Property Matters are Involved, Notice AC/94-N/136 and NIAG (76)N/4, December 6, 1976;

Drafting International Cooperative Research and Development Agreements,

Intellectual Property Principles and Guidelines in the Field of Licensing and Co-production for the purpose of Armaments Standardization or Interoperability, Document AC/259-D/7000, AC/94-D/283, and NIAG (79)D/1, August 16, 1979.

AC/94 was superseded in 1981 by a cadre group with a broader charter. The newer NATO Group on Acquisition Practices, AC/313, concerns itself with the full range of contractual matters. Through the work of AC/313, NATO has issued a number of useful Allied Acquisition Practices (AACP) Publications.

AACP-1-March 1982, Guidance for the Drafting of MOU's and International Cooperative Arrangements

- o Supplement 1-November 1983, Currency exchange management in multinational programmes
- o Supplement 2-March 1984, Liability for patent infringement in cooperative programmes

- Supplement 3-June 1984, Handling of government-controlled charges in cooperative programmes
- Supplement 4-July 1985, Price adjustments in acquisitions for cooperative programmes
- Supplement 5-March 1986, Handling of Third Party Liability in Cooperative Programmes

AACP-2

- Volume 1-November 1983, Price adjustment practices in national defense contracts
- Volume 2-May 1984, Cost principles and profit policies for defense acquisition contracts

Though focused on inter-allied contractual arrangements among NATO member governments and industries, they do have a broader application. The NATO AACP Publications approach the subject matter from several angles:

- Comparison of prior negotiated contractual arrangements for specific programs (e.g. Alphajet, AWACS, F-16, Tornado)
- Distillation of national regulations, and laws
- General guidelines
- Reconciliation of government (and industry) positions - where feasible

Following an agreement between the NATO Industrial Advisory Group (NIAG) and CNAD, an Industry Interface Group (IIG) was set up in 1982 to support AC/313.

(b) Group on Materiel Standardization (AC/301)

NATO has taken several steps to remedy the deficiencies in the NATO Standardization Agreements (STANAG) system. It is testing a system for monitoring

STANAG implementation by nations which will better inform NATO and national authorities on the status of ratification and implementation by each member nation. In response to a U.S. recommendation, NATO formed in 1977, under CNAD, a new Group on Materiel Standardization to oversee STANAG preparation by other groups and to plan future long and short-term NATO actions pertaining to STANAG's. The Group has been developing plans for improving standardization and interoperability among NATO forces by increasing the number of STANAG's in the materiel area,[138] by expanding the subjects covered, and by looking into already existing international standards in the private sector which can be adopted and used by NATO without further preparations. The Group has been concentrating its attention in the areas of assemblies, components, spare parts and materiels (ACSM) and in the related areas of engineering practices and metrication. The U.S. has completed and presented to the Group several studies covering materials, electronic components, and hardware.[139]

In August 1980, AC/301 recommended to the CNAD the adoption of some 1000 inter-nationally accepted private-sector documents governing metrification and metric dimensioning as NATO's basic metric policy.

(5) Eurogroup

The Eurogroup is an informal association of 11 European members of NATO[140] whose declared purpose is to strengthen the alliance by increasing the effectiveness and cohesiveness of the European defense contribution. Established in November, 1968 at the initiative of British Prime Minister Denis Healey, the Eurogroup's inception represented in major part a response to the

influential congressional movement in the U.S. which advocated a substantial reduction in the size of the U.S. military presence in Europe. It was spawned in an effort to counter arguments that the U.S. shouldered a disproportionate share of NATO burdens.[141]

From its original objective of encouraging and giving support to the continuing and vital presence in Europe of American as well as Canadian forces, Eurogroup has since expanded its role to one of ensuring a stronger and more cohesive European contribution to the common defense. The Eurogroup has sought to achieve this aim in two ways:

- serving as a vehicle for member countries to contribute to overall Alliance security by coordinating their defence efforts and by making best use of the resources available for defense, and;
- providing a forum, within the Alliance framework, for the harmonization of European views on important political/strategic questions affecting the defence of NATO Europe.

As an informal grouping within the framework of NATO, Eurogroup has no staff of its own, and possesses no juridical status within the Alliance. It operates principally through meetings of defense ministers (normally immediately preceding biannual NATO ministerial sessions), but also at the level of permanent representatives to NATO Headquarters and at a staff group level which functions to coordinate and prepare work for the ministerial meetings.[142]

(a) EDIP and the Annual Euro Packages

The first major initiative of substance brought forth by the Eurogroup was the European Defense Improvement Programme (EDIP) launched in December, 1970. EDIP was valued at $1 billion dollars[143] or a .75% annual increase in defense expenditures over a 5 year period, half of which involved an increased contribution to Slices XXI-XXV of the NATO Infrastructure Program (this aspect of EDIP is covered in Chapter 2). The other half billion dollars involved general increases across the full range of defense.

This latter part of EDIP was followed the next year, and each year since by a similar initiative, the so-called Europackage of defense expenditures. However, as pointed out by William C. Cromwell in his 1974 paper entitled, The Eurogroup and NATO:

> In appraising the significance of the Europackage, it must be kept in mind that one of Eurogroup's major efforts has been directed toward maximizing the visibility of the European defense contribution to NATO and only marginally toward quantitative increases in its contributions. The Europackage is acknowledged by Eurogroup staff officials to represent largely pre-planned and scheduled equipment replacement actions (which would have occurred in any case through normal equipment modernization procurement), and it has not been possible to determine how much, if any, of the Europackage can be attributed to defense improvement pressures generated within Eurogroup. Though Eurogroup may have played a marginal role as a group pressure organ to extract more generous defense pledges from member governments, its major function in this exercise appears to have been the packaging and projection of significant yet largely routine re-equipment measures in a manner intended to focus attention and recognition on the European defense effort.144

Eurogroup communications are also fond of quoting official U.S. figures which show that the European members of NATO contribute almost 90% of NATO's ground forces, 80% of its seapower, and 75% of its airpower.

FOXC/Disk 955/Ch.5,p.95 and on

(b) Subgroupings

In the first area, that of increasing intra-European coordination, Eurogroup established a number of subgroupings in 1971 that enable the member countries to work more closely together in a number of special fields.

EURONAD, which grew out of a review, called EUROSCHED, is a subgroup of the national armaments directors of the Eurogroup[145] countries whose objective is identifying national schedules of equipment replacement, proposing promising areas of cooperative procurement, and developing a common code of equipment collaboration to be applied by member governments.

EUROLONGTERM, a subgroup whose objective is to develop agreed tactical concepts as a basis for specifying operational requirements for weapon systems to facilitate future collaborative procurement programs. Because of the close interdependence between tactical doctrine and the required performance characteristics of weapon systems, the work of this subgroup closely parallels that of EURONAD.

EUROCOM, a subgroup whose objective is developing requirements for improved coordination and interoperability of tactical communications systems between allied armies in the battlefield zone.

EUROLOG is a subgroup which is attempting to improve coordination and achieve a measure of integration among national logistic systems of military units operating in adjacent areas of deployment.

EUROMED is a subgroup which seeks to advance cooperation in the field of medical services. Since 1971 EUROMED has investigated possibilities for cooperation through the reciprocal use of national facilities for training armed forces doctors, and the coordination of medical-scientific research and development.

EUROTRAINING is a subgroup which functions to facilitate collaboration to promote common training approaches and to increase the joint utilization of training facilities rather than continued reliance on national programs in all areas.

When German Defense Minister Hans Apel took over the Chairmanship of the Eurogroup in January 1980, Eurogroup planned to considerably expand its multilateral activities, particularly in the field of air defense.

(i) EURONAD

One of the most significant of the subgroups is EURONAD. The initial Eurogroup effort in this field was undertaken in 1970-1971 with the objective of reviewing major weapon systems in national planning schedules in order to identify similarities in military requirements and replacement plans that could offer opportunities for future cooperative procurement (including research and development, production, acquisition and maintenance support). In 1972 this review culminated in the designation by Eurogroup ministers of specific weapon systems to be examined more carefully with a view toward joint procurement in line with the anticipated meshing of replacement schedules.

These included a future main battle tank, howitzers, aircraft identification equipment and approach and landing systems, interceptor aircraft, tactical missile systems, and tactical communication systems.

Of significance was the adoption in 1972 of a set of Principles of Equipment Collaboration by all Eurogroup countries. In brief, these principles call for:

- Regular exchange of information on future equipment intentions—with annual meetings to identify and exploit opportunities for joint action;

- Systematic review of the possibilities for collaborative development or procurement—before formulating a military requirement;

- Maximum cooperation in procurement—even when the development or production may have been initiated outside the Eurogroup;

- Maximum standardization—of systems, where militarily essential; or at least characteristics and components, where joint operation or sup-port is likely (including modifications after equipment has entered service);

- Maximum joint follow-on support—in both production logistics (spares) and maintenance logistics (storage and distribution of spares);

- Management and cost controls—so that acquisition costs are within the budgets of participating countries, particularly the smaller ones.

An example of EURONAD's role in facilitating cooperative procurement is the five-nation decision to procure the U.S. Army/LTV LANCE from the United States, the procurement and deployment of which involves another interesting case of allied cooperation. At the biannual meeting of the defense ministers of ten-nation Eurogroup on December 5, 1972 it was announced that five European armies intended to acquire the LTV Lance tactical surface-to-surface missile from the United States. British Defense Minister Lord Carrington was deputed to negotiate terms on behalf of the UK, the Netherlands, Belgium, the FRG, and Italy, following extended visits to the U.S. during the previous eighteen months by officers of the armies concerned in order to evaluate the new artillery weapon system. The Lance's range is around 112 km.

There were three tactical surface to surface missiles in service in NATO, at that time, which were capable of delivering both nuclear and conventional warheads. These were: the unguided rocket Honest John with a range of 25.9 km. introduced to allied armies starting in 1954; the tactical guided missile Sergeant with a range of 137 km. introduced into the U.S. Army Europe and the Bundewehr in 1962; and the newer Pershing 1A with a range of about 730 km. France's Pluton tactical nuclear missile entered service in the early 70's along with the Lance.

The delivery vehicles for these nuclear missiles are deployed with the armies of the user nations, but the nuclear warheads - in common with all NATO's other tactical nuclear explosives (except for the UK and France) - are stockpiled under US control for use under a doublekey arrangement. This effectively precludes any employment of tactical nuclear weapons by the European members of NATO without the active concurrence of the White House. The Procurement of the required installations, Special Ammunition Storage (SAS) was funded through the NATO Infrastructure Program.

NAMSA provides the full range of logistics support for the Lance missile. This support is managed through a Weapon System Partnership (WSP) Committee composed of a representatives of the 5 procuring European nations.

(ii) EUROCOM

The impressive level of activity of Eurogroup's subgroupings has not been at the expense of U.S.-European cooperation either. As an example, EUROCOM has been involved in a series of bilateral discussions with the U.S. aimed at understandings that can form the basis for NATO agreements. In October 1976, the U.S. and EUROCOM agreed to Terms of Reference for the EUROCOM-U.S. Working Party which formalized objectives, and added a new cryptographic working party.

The EUROCOM-U.S. Cryptographic Working Party has been addressing the highly technical and complex problems which must be resolved to assure not only that the various landforce tactical communications systems of the individual Eurogroup nations and the U.S. will interoperate, but that they will do so

securely. Mutually acceptable ways to satisfy U.S. security concerns, while at the same time advancing the cause of rationalization and standardization, are being explored. In 1977 a large number of parameters that permit direct interoperability between the EUROCOM and U.S. systems were agreed to. Work has continued toward reaching agreement on the balance.

(iii) Eurotraining

Another subgroup of the Eurogroup where significant progress has been made is Eurotraining. Since Eurotraining was formed in 1973 firm agreement has been reached on a total of 23 projects. Five more have been agreed in principle and ten recommendations have been presented for consideration. These include the joint training of navigation and military ATC personnel, training for F-16 personnel, and training of heliocopter personnel in anti-tank warfare. Again citing the case of the Lance missile system, at a Eurotraining meeting in 1973, the FRG proposed plans to expand its LANCE School facilities and offered a course of instruction for detachment commanders and maintenance personnel. These courses have since been conducted at the German Technical School in Aachen. Subsequently, the United Kingdom offered and conducted training courses in gunnery and ammunition at the School of Ammunition in the U.K. The U.S. has been training LANCE personnel from Belgium, the FRG, Italy and the United Kingdom at Fort Sill, Oklahoma. In June 1977, a working group agreed on a LANCE syllabus for a course on Laying, Loading and Fire Control Duties. The first course of four weeks duration was held at the German Missile School, Geilenkirchen, in October 1977 and was attended by students from Belgium, Netherlands, the FRG and the United Kingdom.[146]

More recently, firm agreement has been reached on a project for joint training in electronic warfare at a facility in Italy. Training of military ATC personnel will start shortly at Furstenfeldbruck. Training of NADGE air defense personnel will also start shortly. Tornado pilot training was to start in England in August, 1980, while training on Tornado weapon systems was to get underway in Jever, in the FRG.

Helicopter control officers for anti-submarine warfare will be trained in the U.K. and the Netherlands.[147]

(c) <u>The Two-Way Street</u>

As for Eurogroup's working toward harmonization of European views within the Alliance vis-a-vis the transatlantic dialogue, the focus since the mid-70's had centered on the need for more of a "two-way street" in NATO defense procurement. Here Eurogroup has assumed the role of the principal European forum within NATO attempting to reconcile intra-European interests with transatlantic interests.

Since its establishment in 1968 in response to equity problems facing the U.S.-European relationship, Eurogroup has come to concentrate much of its attention on the armaments development and production aspect of the relationship. Through Euronad, the Eurogroup has sought ways in which standardization can be increased while promoting the strengthening of the European technological and industrial bases. In order to reconcile these dual, and often contradictory concepts, in 1973, Eurogroup developed the idea of the "two-way

street". This "two-way street" concept grew in reaction to what had previously been a one-way flow across the Atlantic, with very few exceptions, in the procurement of defense equipment and technology.

Secretary of Defense Schlesinger, immediately endorsed and encouraged the concept. And then, as the U.S. continued to refocus its attention away from South East Asia and back toward NATO Europe during 1974, backing in Congress, the DOD, and the services for greater standardization within NATO began to pick up steam. By early 1975, the standardization drive, but this time one tempered by a commitment to work towards a "two-way street" in the North Atlantic arms trade, was beginning to bear several major collaborative projects; the multinational F-16 fighter, the Roland SAM system, and the NATO AWACS program.

Given the direction and magnitude of the existing one-way flow, (as a rule of thumb, a ratio of 1:10 is often given)[148] some in Europe felt that the initiative for opening the flow to traffic heading the other way could only come from the U.S. But, it was also recognized that the "two-way street" concept could only work if something tangible was first achieved on the European side, so that they could operate on a collective basis vis-a-vis the U.S. and a coherent dialogue could follow. In order to bring this about the Eurogroup intensified its activity in coordinating information concerning national requirements and programs.

(6) The European Program Group (IEPG)

Not only was intensified coordination called for on the part of the Eurogroup, if the European nations were to speak with one voice and to participate in transatlantic cooperation on a more equal footing, some mechanism was needed for fitting France into the process.

The issue of France's special relationship within NATO, however, continued to be an obstacle to the objectives of NATO's Eurogroup. On the one hand there was the French concern for American political, economic, and military denomination when operating within the framework of the integrated command side of the Alliance; the reason for her staying outside the DPC (and thus the military side of NATO) and the Eurogroup. But then the inclusion of France as Europe's largest armaments producer was an obvious imperative for talking on any genuinely European basis. Fortunately this barrier was circumvented, in late 1975 and early 1976, with the formation of the independent European Program Group (IEPG, or EPG, whether one wants to emphasize the 'independent' aspect of the group vis-a-vis NATO). The formation of the IEPG, as Eurogroup plus France, was definitely a step in the right direction, and contributed considerably to clearing the air of dogmatic hang-ups, while still allowing for a forum that promotes intra-European as well as trans-atlantic cooperation in armaments related areas.

Since its first meeting in February 1976 the IEPG has continued its efforts to rationalize the European defense sector and increase the ability of the European nations to participate in standardization programs with the United States

on a more equal footing. The Ministerial level IEPG has two immediately subordinate groupings, the IEPG National Armament Directors and the European Defense Industries Group. Once fully established, in matters of weapon standardization, Euro-Eurogroup's EURONAD subgrouping has tended to defer to the IEPG.

The IEPG, chaired by Italy from its outset in 1976, will have a Norwegian as Chairman beginning in 1980. The IEPG has no permanent staff, but has created three panels:

- an equipment planning panel, involved in coordinating equipment replacement schedules;
- a specific projects coordinating panel, overseeing four established subgroups (improved 105mm tank ammunition, tactical combat aircraft, short-range unguided antitank missiles, and mine hunter ships) and six exploratory subgroups (fast patrol boats, lightweight torpedoes, military helicopters, medium-long range guided and unguided antitank missiles, very low-level man portable surface-to-air guided weapons and army mine systems);
- a defense economics and procedures panel, overseeing five subgroups (project procedures, compensation, competition, industrial cooperation, and arms export).[149]

In contrast to the case of the NATO Industrial Advisory Group (NIAG) which advises the CNAD, the IEPG's European Defense Industry Group (EDIG) advises the ministerial level of the IEPG directly. This difference means that industry advice for the EPG goes directly to the ministerial level without the

intercession of the armament directors. This had been accredited in some quarters as having allowed the IEPG to operate more effectively.

The IEPG has focused upon intra-European equipment matters, but during the past year has had under consideration 17 US systems proposed by the DOD for dual production. During 1979 the US and Canada met with IEPG representatives in sessions chaired by NATO's Assistant Secretary General for Defense Support. Discussions centered on dual production, the family of weapons concept and methods of identifying transatlantic procurement opportunities.[150]

(7) The Western European Union (WEU)

As with the IEPG, though not a part of NATO, The Western European Union is a closely related organization worth mentioning here. The WEU was formed in 1955 as a latter-day outgrowth of the Brussels Treaty of 1948. As previously mentioned in this paper, the Brussels Treaty was signed by France, UK and the three Benelux countries; representing at the time the most closely-knit international peace-time cooperative association ever known.

The five signatories set up a Western Union Defense Organization (WUDO) whose military side served as the NATO's pre-cursor. The Brussels Treaty provided for collective self defense, mutual automatic military assistance in the event of war, and for collaboration in economic, social and cultural matters. On its civil side, WUDO served as the pre-cursor of the Council of Europe as well, an organization to which it also transferred many of its functions and committees in June, 1960. WUDO also spawned a number of key collaborative

programs including what was to become the NATO Infrastructure Program (pp. 4-5 in Chapter 2), and several early weapon system projects which involved the license production of British fighters and engines in France, the Netherlands and Belgium (see pp. 6-7 of this chapter).

Since 1955, the WEU has served as a convenient forum for bridging gaps on a provisional basis between individual member states and other international groupings (i.e., the FRG and NATO, the UK and the EEC, and France and the Eurogroup). The Western European Union came into being in May 1955 with the ratification of Protocol No. 1 to the Brussels Treaty. In addition to the original five powers this involved an expansion to include Italy and the FRG. Following the collapse in 1954 of the plans for creating a European Defense Community, some means had to be found of associating the defense effort of the Federal Republic of Germany with NATO. A document was drawn up stating that the occupation regime in the FRG would be ended and that the FRG would join NATO was incorporated into a series of agreements signed in 1954 and ratified the following year by the seven powers. By this Treaty, among other things, the FRG undertook not to manufacture certain armaments.

Following this the WEU was to provide the framework for settling the status of the Saar which was to have a European Statute following approval by a referendum. Held in October 1955, the majority opted instead for incorporation as a 'Land' into the Federal Republic of Germany. This was accomplished in July, 1959.

The WEU also helped to bridge the gap between the EEC of 6 and the UK until the latter finally acceded to the Treaty of Rome, and between France and the Eurogroup until the creation of the Independent European Program Group in 1976.

The seven signatory powers are committed by treaty to developing the closest possible cooperation between the member states through the standing Defense Questions and Armaments Committee of the WEU assembly.

The Assembly of WEU consists of the delegates of the member states to the Consultative Assembly of the Council of Europe (Strasbourg), and meets twice a year in Paris. The Assembly considers defense and other policy matters of common concern to the 7 member states and makes recommendation to the Council of Europe, to national parliaments, governments and NATO.

The WEU is complimented on the Military side by FINABEL, an organization of the Army chiefs of staff of the seven members which studies the harmonization of tactics, logistics and training.

Even though the WEU has produced little in the way of tangible results in weapons collaboration, it has continued to serve as another constructive link in the broad-based efforts to promote a continuous dialogue and maintain visibility for the issue.

Though the WEU could help to bridge the gap between France and the Eurogroup it lacked those European nations on NATO's flanks. And if Eurogroup's

deficiency of excluding Western Europe's largest armaments producer, France, was to circumvented, a new framework was needed. Prodded finally to accept a Eurogroup overture by the stinging defeat of its Mirage F-1 by the USAF F-16 in mid-1975 as the F-104G replacement aircraft for NATO's four small northern members, another European forum was set up outside of NATO to provide greater armaments standardization, the European Program Group (EPG), treated in the previous sub-section.

(8) The NATO Long-Term Defense Program

The Long-Term Defense Program (LTDP) added a new dimension to NATO force planning. It provides a long-term, detailed program of improvements in ten high-priority functional areas. Moreover, it was designed to provide rationalization of Alliance programs through greater coordination and cooperation between national programs.[151]

The LTDP aims to increase cooperation between Allies over the next 10-15 years so that national efforts will be more complementary, while attempting to minimize the waste of resources on redundant or incompatible projects. NATO has been establishing the LTDP baseline which will provide the blueprint for facilitating coordination of follow-through actions and against which progress in LTDP implementation can be measured. The Allies are working to move forward in spelling out in greater detail the implementing actions the Alliance must take. This will include specific quantities, milestone dates, costs and time schedules.[152]

NATO has established a coordinated framework for implementation of the Long-Term Defense Program (LTDP) and has begun numerous Alliance and national efforts to fulfill its requirements. One such effort is the Periodic Armaments Planning System aimed at producing jointly agreed requirements for future arms and equipment and appropriate cooperation in research, development and production of major weapons and military equipment.[153]

The initial proposal that NATO adopt an LTDP, was made by the U.S. at the May, 1977 meeting of North Atlantic Council. The NATO Defense Ministers agreed that the Long-Term Defense Program should consist of a series of carefully selected priority programs each of which should: (1) be designed to remedy a serious deficiency in NATO defenses, (2) identify national or multilateral contributions required to remedy the deficiencies, over the long-term (1985-1990) as well as mid-term (1979-1984), (3) establish timings for the critical phasing of these contributions, (4) exploit all opportunities to achieve greater interoperability and standardization, and (5) recommend machinery to facilitate greater Allied cooperation. Ministers further agreed that a report on progress made and programs agreed upon would be made to NATO Heads of State and Government meeting in late May 1978 in Washington.[154]

The NATO Defense Planning Committee selected ten long-term priority program areas and established task forces to develop a long-term program in each area. With the exception of the task force on theater nuclear force modernization, which is under the aegis of the standing NATO Nuclear Planning Group, the other nine task forces had to be established and were made responsible directly to the Executive Working Group and its chairman, NATO's Deputy

Secretary General. The task forces consist of NATO civilian and military officials, experts and consultants acting in an international capacity. Terms of reference were approved for each task force. They stressed the need to project at least ten years in the future, to establish priorities, to identify cooperative projects which need to be funded in common, and to take relevant new technology into account. The ten areas selected were: readiness; reinforcement; reserve mobilization; NATO's maritime posture; air defense; communications; command and control; electronic warfare; rationalization (including standardization and interoperability) con-sumer logistics; and theater nuclear force modernization.[155]

Within the U.S. Department of Defense, groups parallel to the NATO task forces were established to support their work by providing advice and data requested by the NATO task forces. In addition, the DOD revamped its organization and programming to enhance the US contribution to NATO. DOD and Service components strengthened their focus on NATO-oriented activities and tasked key civilian and uniformed managers to supervise this effort.[156]

At their 6-7 December 1977 meeting, Defense Ministers reviewed a report on the progress of the Long-Term Defense Program and endorsed additional guidance given the task forces by the NATO Defense Planning Committee (DPC) in Permanent Session, directing the task forces to focus more sharply on a limited number of selected main action areas for which they are to develop cooperative and coordinated programs with specific and concrete tasks for NATO countries and agencies for inclusion in their spring report.[157]

In October 1979 the high-level NATO civil and military officials designated as program monitors by Secretary General Luns submitted their first detailed reports. These reports covered refinement and implementation actions taken in all of the nine conventional LTDP program areas except air defense (which was still under development). They assessed progress made on individual measures and each of the program areas as a whole, and identified problem areas and issues for ministerial attention and suggested remedial actions.[158]

Some two years later, at a December 1979 meeting of the DPC, the NATO Defense Ministers, made a comprehensive assessment of the progress NATO had made in the implementation of the LTDP.

To quote the Sixth Annual DOD Report to Congress in January, 1980, on Rationali-zation/Standardization within NATO.

> Progress in each of the LTDP program areas has, in general, been satisfactory. Rapid progress is being made in the readiness of units, increasing the speed and level of reinforcement, advancing integration and interoperability of communications, and providing a logistics coordination capability; but action must be accelerated in the areas of air defense, electronic warfare, reserve mobilization and provision of munitions stocks.159

(9) The NATO Armaments Planning Review (NAPR) and Periodic Armaments Planning System (PAPS): A Framework for the Harmonization of Requirements within NATO

As the NATO RSI drive picked up momentum in 1974 and 1975 with the shift of American preoccupations away from South East Asia and back to Western Europe, initiatives began to appear at the institutional level. Chief among these,

NATO's Military Committee produced in 1975 its Military Committee Memorandum (MCM) 79-75 recommending that a defense equipment acquisition cycle be considered for the Alliance. That recommendation was reinforced in discussions held by the National Armament Directors' Representatives (NADREPs) in 1976 and their subsequent recommendations to the Conference of National Armaments Directors (CNAD). In the fall of 1976, the CNAD established an Ad Hoc Study Group to examine a possible Periodic Armaments Planning System (PAPS) for use by NATO.

The basic concern of all these groups was that national equipment programs were not sufficiently responsive to the needs of NATO forces, especially in the areas of standardization and weapons interoperability.

The concerns expressed in MCM 79-75 are worth reviewing. First, the NATO Military Committee (MC) felt there was a definite need to increase the NATO Military Authorities' contributions to the planning process. Second, a cyclical method of work was seen as being desirable. Third, MCM 79-75 stated that special attention was necessary to define the interface between equipment planning and force planning. Fourth, time scales of planning were felt to be too short. Fifth, full Alliance participation was desired. These concerns became the genesis of the program of work for the Ad Hoc Study Group whose efforts have resulted in two programs — The NATO Armaments Planning Review (NAPR) and the Periodic Armaments Planning system (PAPS).[160]

The two programs, NAPR and PAPS were to provide CNAD with additional management tools for furthering Alliance standardization and interoperability. The

two systems were to supplement the existing organization and procedures in place since 1966, not replace them.

(a) NAPR

The NATO Armaments Planning Review (NAPR) is a cyclical review process which will provide important planning information to NATO's Conference of National Armament Directors (CNAD) once a project has been firmly established by one or more nations. The information will be of special interest to the non-participating nations who might be considering joining at a later date, as well as the NATO military authorities (NMA's) whose job it is to plan for the integration of the weapons into the alliance's force structure.

This review process will allow the National Armament Directors (NAD's) to focus their attention on the most important and promising opportunities for improving standardization and interoperability of NATO's future defense equipment.

In essence, the NAPR consists of an annual input from nations of their plans to replace currently deployed equipment. A second input is an assessment by the National Military Authorities (NMAs) of their priorities for standardization/interoperability (S/I) in key categories of equipment (mission areas). The European input is provided through the Independent European Group (IEPG), with U.S. and Canadian inputs provided separately. The replacement schedules and NMA inputs are provided to the International Staff and CNAD Main Armament Groups to be reviewed for opportunities for cooperation not previously exploited. This review can also identify areas where nations are diverging

from standardization or interoperability as a result of independent national decisions. The conclusions and recommendations drawn from this review are then presented to CNAD for action.[161]

At the fall 1977 meeting, the CNAD directed that a trial be conducted using a few equipment categories to determine the utility of these new procedures. The trail was successful, and the CNAD directed implementation of the system in October, 1979.

(b) PAPS

One inherent limitation to NAPR's effectiveness is that the data presented represent a rather mature stage of national planning. When national equipment replacement schedules are firm, it is difficult to accommodate program changes brought about by attempts to collaborate. In seeking earlier communication on national programs and plans, two problems encountered are: a lack of early visibility into national military requirements and of NATO review before a national commitment was made, and incomplete information on national plans; and a lack of discipline in the reporting process for collaborative programs. Therefore, what was needed was another system that would compliment NAPR's stop gap measures by taking into account the full life cycle of a weapon system. The proposed solution is the Periodic Armaments Planning System (PAPS).[162]

To this end, a Periodic Armaments Planning System (PAPS) was developed as somewhat of an attempt to internationalize A-109. The aim is to ensure that nations exchange views early enough in a weapon's life-cycle, and to guide

these early activities along a cooperative approach to fulfilling the requirements.

The PAPS involves the consideration of mission need documents submitted by NATO or national military authorities to NATO's Main Armament Groups, followed by development of detailed military requirements statements, including technology and cost parameters, and finally the establishment of ad hoc steering groups outside of the NATO machinery and made up of those nations choosing to cooperate on particular programs.[163] These ad hoc steering groups will usually take the form of either a Steering Committee, a NATO Production and Logistics Organization (NPLO), or a more limited joint configuration control committee.

There is a great deal of similarity between PAPS and the DSARC process, but two differences are worth noting. First, PAPS defines the start of the weapon system life cycle as the point when military authorities forward the mission need. This is somewhat earlier than when DOD defines the start, the point when approval of the need is obtained from the Secretary of Defense. PAPS also recommends attention to the in-service and disengagement phases at the mature stages of the weapons system life cycle, whereas DSARC visibility terminates at the production decision.[164]

Milestone 1	Mission Need Document (MND)[4]
Phase 1	Mission Need Evaluation formerly Long-range Forecasting
Milestone 2	Outline NATO Staff Target (ONST)
Phase 2	Pre-feasibility
Milestone 3	NATO Staff Target (NST)

Phase 3	Feasibility
Milestone 4	NATO Staff Requirement (NSR)
Phase 4	(Project) Definition[5]
Milestone 5	NATO Design and Development Objective (NADDO)[5]
Phase 5	Design and Development
Milestone 6	NATO Production Objective
Phase 6	Production formerly Acquisition (Prod and deployment)
Milestone 7	NATO In-Service Goals (NISEG)
Phase 7	In-Service
Milestone 8	NATO (National) Disengagement Intention (NADI)[5]

The discussions of the Study Group that developed the PAPS were guided by a recognized need to reconcile:

- The pressing military needs of the Alliance;
- Political and economic realities, and;
- Maintaining broad cooperation throughout the life cycle of a weapon system.

Two general principles are to be kept in mind, however:

- The sovereignty of the nations in equipment decisions, while providing the means of achieving and maintaining cooperation in R&D and procurement efforts, and;

- Utilization of the basic existing Alliance structure without radical change. Providing elements of that structure with appropriate roles and clear relationships and tasks in a formal process directed towards greater weapons harmonization.

During 1979 the CNAD began a test of the Periodic Armaments Planning System. Military authorities submitted nine mission need documents for use during the trial, and ten programs already in progress were to be used to test PAPS procedures at later program milestones.

The challenge to PAPS is one of guiding early considerations of the allies toward cooperation and then developing a feedback loop throughout the life cycle. It should be noted that this description of the PAPS phases follows the course of the normal project. The process is flexible enough to permit skipping steps whenever it makes sense to do so. However, the formalization of the process ensures that such skipping will be a conscious, well-thought-out move, and not random or accidental.[165]

Preceding the PAPS phases, we have the normal long term planning process, mission analysis, etc., generally identified as Long-Range Forecasting. This is a continuously performed function, broader than individual weapon systems. Long-Range Forecasting represents an assessment of the "state of the world," including technological, economical, social, and political factors. The East-West military balance is established which effects various aspects of planning. Mission analysis of the current and future military balance is continuously assessed by the NMAs. This includes threat projections and analysis,

development of Warsaw Pact tactical doctrine and concepts, assessment of equipment capabilities vis-a-vis the threat, and scenario development. These trends are studied for important implications and continuously incorporated into the ability of the Alliance to detect the threat through NATO doctrine, tactics, force levels, logistics, weapons acquisition, and identification of other possible deficiencies in the forces. Harmonization of the NATO perceived threat, doctrine, and concepts is especially important in the development of mission analysis, because this provides the basis for the mission need and successful cooperative research and development programs. Long-Range Forecasting leads to the Mission Need Evaluation which initiates the PAPS process.[166]

<u>Phase 01, Mission Need Evaluation</u>, starts with the input from the continuous process of mission analysis. Specific operational deficiencies in capabilities are defined, usually in relation to a mission area or tactical sub-concepts. These deficiencies are documented in operational terms as a "mission need" for the basis of this input to phase 01. This mission need document (MND) is prepared by either the national military staffs or the NMAs. The MND is forwarded for action to the Office of the Assistance Secretary General for Defense Support (ASG/DS), who coordinates the document with the NADs, all NMAs, and other NATO staff agencies. This coordination invites participation of all interested parties in seeking a NATO solution to the mission need. Although MNDs are forwarded to the NADs, national responses may be provided via Main Armament Group (MAG) representatives in the appropriate MAG forum, especially for those MNDs without significant impact.[167]

The MND is ultimately transformed by an ad hoc subgroup or panel of the appropriate MAG into a set of functional system requirements. The functional system requirements, called an Outline NATO Staff Target (ONST), are built on the mission need, and include general financial, technical, and schedule gross estimates so nations can better assess the necessity and desirability of entering into a cooperative development program. The subgroup/panel is established with representation from the interested nations, NMAs, and NATO agencies. The subgroup/panel provides the forum for discussion of a NATO response to the mission need, and is charged with integrating the technical, financial, and operational matters into the collaborative requirement.

Although all nations may not participate in this or the development phases, they are encouraged to join in the drafting of Outline Staff Target. This is done in order to harmonize requirements so as to achieve greater acceptance in, and eventually, procurement by these nations. To avoid narrowing the range of alternatives at this stage, the Outline Staff Target must not overspecify characteristics of the required system. Phase 01 ends with submission of the Outline NATO Staff Target to the nations for approval. The ONST is comparable to the Mission Element Needs Statement (MENS) of the U.S. acquisition process.[168]

Phase 02, Pre-feasibility, is an analysis of the alternatives for meeting the Outline NATO Staff Target through use of pre-feasibility studies of competitive concepts provided by member nations, industry, or as requested and funded by the subgroup. Where funding is needed, Terms of Reference (TOR) and an MOU are also required. A NATO Staff Target (NST) is developed, based upon the

evaluation of the pre-feasibility studies detailing the capability being sought, and a summary of the most promising candidates. The subgroup, normally composed of members from nations planning to participate, also drafts appropriate follow-on documentation, such as an MOU and Statement of Work (SOW) for Phase 03. Other than minor commitments of resources, participation in the subgroup has been dependent solely on interest. The signing of this MOU, however, begins a commitment of every-increasing amounts of resources, as well as work-sharing arrangements through the production and in-service phases. The group may wish to develop the initial project plan, a plan that could be used as the primary program management instrument integrating the essential technical, political, military, financial, and managerial factors during the subsequent phases of the weapon system life cycle. It is comparable to the Program Management Plan/Acquisition Strategy at DSARC Milestone 1.[169]

Phase 03, Feasibility, begins with approval by participating nations of the NATO Staff Target and initial project plan, and the signing of the MOU. NATO's role diminishes with the relationships denoted in the MOU; the nations are now responsible for all centralized management of the technical business and logistics aspects of the joint project. The project group is now responsible for developing a system specification and logistics plan, and evaluating candidate concepts to provide necessary performance capabilities described in the Staff Target. The system specification, logistics plan, and the project group's estimates of unit production and fly-away costs, life-cycle costs, manpower and training requirements, development and production schedules, and other relevant data become the Staff Requirement. The Staff Requirement represents a major decision document, since the participating countries will

now commit to major development resources, and must assess the benefits of acquiring and budgeting for the system. Co-production and licensing agreements must be worked out. The NATO International staff publishes progress reports and monitors the project group. Phase 03 is concluded with approval of the NATO Staff Requirement and signature of the associated MOU by the participating countries. This point in PAPS corresponds to Milestone II of DSARC in the U.S. process.[170]

Phase 04, (Project) Definition, consists of the development of design details and subsystem specifications which comprise the system. The project group transitions into a NATO Project Steering Committee to provide periodic reports to the CNAD and through the office of the Assistant Secretary General for Defense Support (AG/DS) to the non-participating countries, the NMAs, and other NATO agencies. These reports should provide sufficient information for force structure, doctrine, and tactical/operational concepts, training, and logistics. A joint common configuration management system should be set up early in the project definition stage, to remain under the technical authority of the developing nations until at least completion of the acquisition phase.

Phase 05, Design and Development, consists of design and production engineering, and perhaps, prototype evaluation. Completion of Phase 05 in PAPS corresponds to Milestone III in DSARC.

Phase 06, Production, is the production and deployment phase. The organization and reporting remain the same. Operational data from using units are

collected to assess the adequacy and highlight problems in performance, safety, reliability and maintainability, logistics, training, etc.

Phase 07, In-Service, continues the data collection and coordination of Phase 06. At some point, nations will express their intentions to retire the system, identifying the specific point in the life cycle when a nation programs replacement of the existing system with a new capability, feeding back to phase 01.[171]

The testing of PAPS was completed in 1981, followed by CNAD approval for implementation of the system in October of that year, NATO Document, AC/259-D/901. The PAPS Handbook, Volumes I & II can be obtained from NATO Headquarters, Brussels, Belgium.

PAPS (and the associated terminology) is slated to supersede the less formal, but similar system spelled out previously in this chapter for the NATO Naval Armament Group (NNAG).

(10) Assuring that the U.S. Defense Acquisition Process is Aligned with Alliance Needs - DOD Directive 2010.6.

The U.S. Department of Defense has continued to do its part in assuring that its own national acquisition process (outlined in DOD Directives 5000.1 and 5000.2) does not operate in isolation from NATO's processes and needs. In January, 1980, the DOD thoroughly revised its Directive 2010.6 entitled "Standardization and Interoperability of Weapon Systems and Equipment within NATO,"

which had been originally published in 1977. The new directive was written so as to further emphasize the U.S. commitment to standardization and interoperability with Alliance forces. It stresses the importance of dual production of already or nearly developed systems, underscores the value of codevelopment where feasible, and points up the need for more open competition within Alliance industry.

The new directive in addition contains specific guidelines for NATO RSI in weapons systems acquisition. In the implementation of DOD 2010.6, the Defense Systems Acquisition Review Council (DSARC) is to play a critical role in ensuring that cooperative efforts succeed. For systems with a total or partial application to NATO, the Mission Element Need Statement (MENS) is a critical milestone in the DSARC process. In the MENS implications for RSI are to receive careful attention. Once a program is initially approved, it is continually reviewed to ensure that RSI objectives are met.[172]

C. THREE KEY INSTITUTIONALLY RELATED NATO PROJECTS—THE NATO LWSR FIGHTER, THE NATO ATLANTIC AND NBMR 3

With the institutional background provided by the previous sub-chapter this sub-chapter serves in a transitional role for our shift to the individual project level.

Both of the first two of NATO's institutional projects, the LWSR fighter and the Atlantic, benefited greatly from a broader set of circumstances peculiar to the latter half of the 50's. First, these involved the U.S. willingness to assist the European aircraft industry in getting back on its feet through both a development program and a production program: the Mutual Weapons Development Pro-gram (involving the first two of these projects, as well as many other smaller scale efforts); and the U.S. Off-Shore Procurement Program (involving only the LWSR fighter, since the U.S. had reversed its policy by the time the Atlantic entered production Off-Shore Procurement was continued within the larger Mutual Defense Assistance Program (MDAP) and stimulated as well the series of multinational license production projects starting in the late 50's and early 60's (e.g., Hawk, Sidewinder, and F-104G, all treated in Chapter 7). A second major factor contributing to the partial success of the NATO LWSR fighter and Atlantic programs, as well as the later license production projects, was the need of the reemerging German aircraft industry for foreign designed and developed systems, having almost none of its own at the time, combined with the German government's policy of assuring that this reemergence occurred within the framework of NATO.

NBMR3 represents the inadequacy of NATO's first set of institutional procedures, especially in light the changed scenario emerging in the early 1960's.

The NATO Atlantic Maritime Patrol Aircraft program, which moved from conception to a joint development program between December, 1956, and December, 1959, was NATO's first step in the process of developing NATO Procedures for cooperation in R&D and production of military equipment. The procedures generally followed in the Atlantic program were codified in C-M(59)82[183] in 1959, which brought the NATO Basic Military Requirement (NBMR) procedure into being. After having proven themselves totally inadequate over the following several years the NBMR procedure was finally superceded by a new set of more flexible procedures, as spelled out in NATO Document C-M(66)33. C-M(66)33 represents the offical organization and procedures through which the NATO member states have operated ever since (i.e., if they worked through NATO at all in establishing a given joint weapon project).

It is important to distinguish this unique role of the Atlantic project as NATO's "firstborn" from that of other earlier or concurrent projects. The one preceding NATO sponsored weapon project was of a different sort altogether. Whereas the Atlantic was truly NATO sponsored from its inception, the NATO LWSR fighter (Fiat G-91) was more the outcome of a U.S. subsidized (MWDP funding) NATO competition among national prototypes. Another earlier project involving the production in Belgium and Netherlands of the British Hawker Hunter under license in the mid-50's was the result of the U.S. MDAP's Off-Shore Procurement program, not a wider NATO initiative. And finally the wave

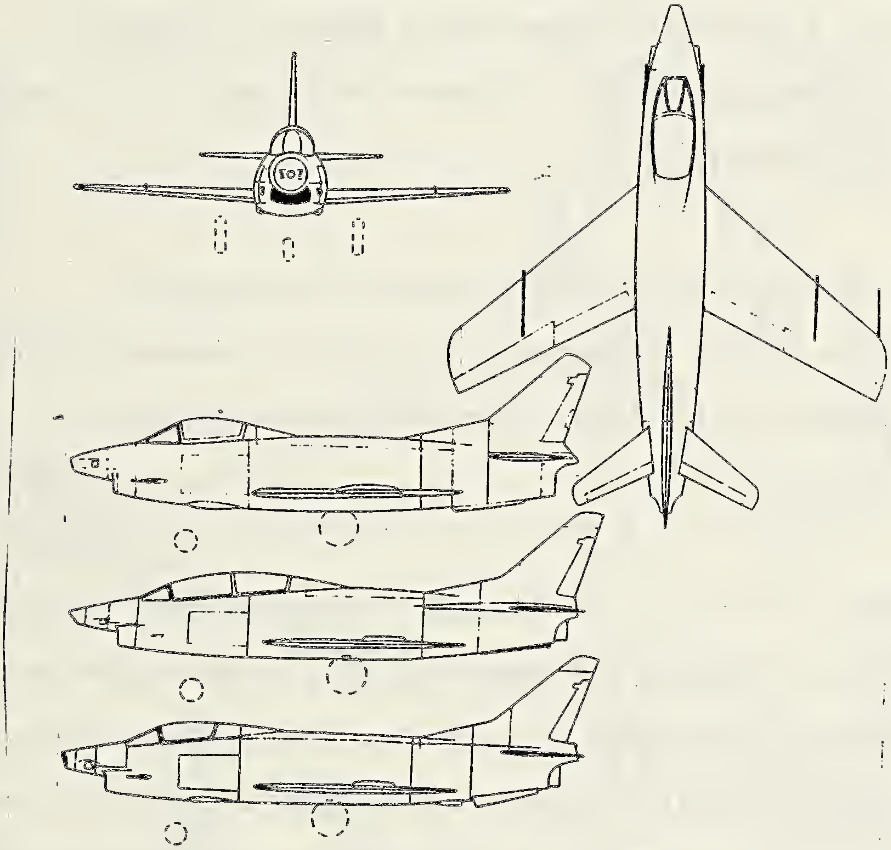
of joint production programs such as the Hawk, Bullpup and Sidewinder missiles, the F-104G Starfighter and several others involved joint production under license within Europe of a unilaterally developed system that was already under production elsewhere (the U.S. in all cases except for the French AS-30 missile).

1. THE NATO LWSR FIGHTER: THE FIRST NATO WEAPON SYSTEM PROJECT

a. From SHAPE's Statement of the Requirement to the Design Competition.

In the field of ab initio development of weapon systems by NATO there were only two major projects in 1950's and early 1960's that progressed all the way from the statement of the requirement by NATO through development and finally into multinational production. These are the NATO Lightweight Strike Reconnaissance (LWSR) aircraft and the NATO Atlantic Maritime Patrol aircraft.

The LWSR was the first NATO joint weapon systems project, one originating within a NATO sponsored competition of prototypes to fulfill a significant allied requirement. In 1953-54, the SHAPE Air Deputy, then General Norstad, was pressing hard for a very light jet fighter for close support of ground troops. A board of officers assigned to the international military staff at SHAPE and Headquarters, Allied Force Central Europe (AFCENT), in December 1953, spelled out the military's idea of the aircraft. They conceived of it as a tough, unsophisticated, inexpensive fighter-bomber which could operate from unprepared landing strips near the front lines in providing close fire support and reconnaissance for ground troops and certain types of interdiction and counter-air missions.[174]



G-91

Source: Rand McNally

More specifically, the requirement called for a fighter:

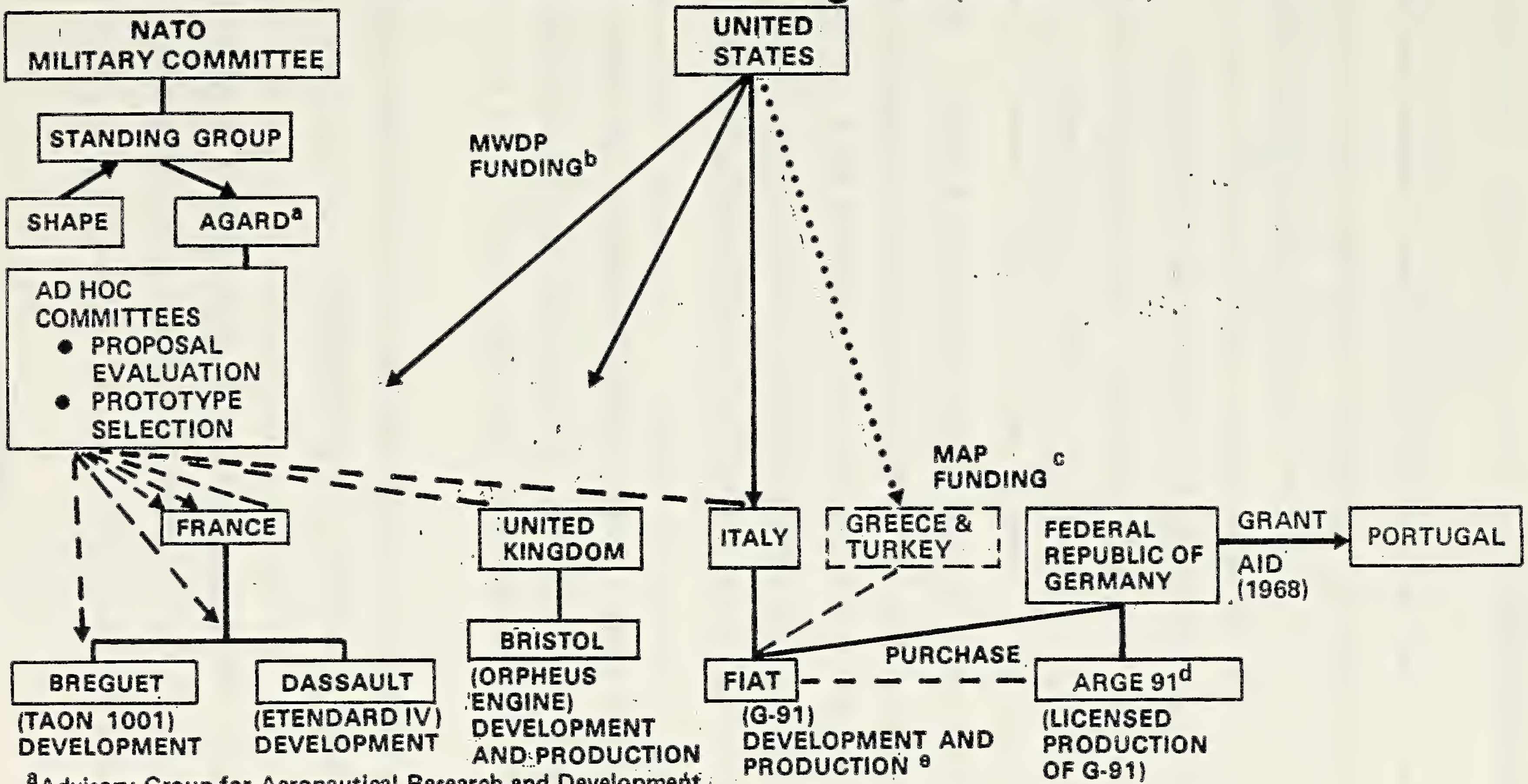
- able to carry a bomb-load of 1,000 pounds (450 kg);
- with an operational radius of action of 112 miles (180 km) and ten minutes permanently over the target;
- maximum speed had to be at least Mach 0.95;
- with a cruising speed of 440 mph (705 km/h);
- a take-off distance of no more than 3,600 feet (1,100 m);
- and most importantly, have full operational capability on unprepared and grass runways.

These operational characteristics were translated into technical specifications as the project progressed up the chain of command of NATO's military side from SHAPE to the Standing Group[175] to the Military Committee[176].

The European aircraft industries were invited to submit aircraft design proposals. Following more detailed development of the military requirements for the weapons system, ten designs were received from French, Italian, and British firms. Design proposal evaluation was assigned to an ad hoc committee formed by the Chairman of the Advisory Group for Aeronautical Research and Development (AGARD, a subagency of, at that time, the NATO Standing Group), an American by the name of Dr. Theodore von Karman. In 1955 this group recommended three designs, the Breguet Taon 1001, the Dassault Etendard VI, and the Fiat G-91, out of the ten proposals submitted, as most nearly fulfilling SHAPE's operational requirements.[177] No British design was selected. Among the losing designs were the British Folland Gnat, Industrie Meccaniche Aeronautiche Meridionale's Aerfer Sagittario II, and the Fiat G.82.

NATO Lightweight Strike Reconnaissance (LWSR) Aircraft

Design and Prototype Competitions (1954-58) Dual Production Program (1958-68)



[a]Advisory Group for Aeronautical Research and Development.

[b]United States Mutual Weapons Development Program (funded allied development efforts).

[c]The U.S. commitment in 1958 to purchase 50 NATO LWSR fighters, from Fiat for Greece and Turkey through the Military Assistance Program (MAP), was reversed in 1962. Due to the gold flow crisis, the United States opted instead to provide the two nations with U.S.- built F-104G starfighters.

[d]A consortium consisting of Dornier, Messerschmitt, and Heinkel.

[e]The Orpheus engine was built under license in Italy by Fiat and in the FRG by KHD.

b. The Prototype Competition

When SHAPE issued the requirement in 1954, the US Mutual Weapons Development Program (MWDP) was just getting under way. All the NATO nations were told that the U.S., in order to provide impetus to the program, would consider supporting, through MWDP funding, a program endorsed by SHAPE as meeting the NATO requirement. Consequently the U.S. financed the development of prototypes based on the three winning designs. This included the production of three G-91 prototypes (and later the pre-production programming of 27 additional aircraft); R&D was financed 30% by the Italian Government and 70% by the American Government, the U.S. share coming to $2.3 million. The U.S. also contributed through the MWDP some $4 million towards the development of the Bristol Orpheus engine used in most of the contenders and all three finalists, and some $5 million for development and construction of three prototypes each for the entries of the French firms Breguet and Dassault.[178]

Meanwhile, in order to provide SHAPE with technical advice, von Karman had organized another advisory committee, this one for prototype selection. Five subcommittees were formed under it to deal with:

(1) Mock-up and requirements, giving guidance to the contractors on design, construction and equipment of prototype mockups.

(2) Flight testing, setting up the series of trials as well as helping contractors with individual problems of flight test techniques.

(3) New developments, responsible for keeping the weapon system project contemporary with the state-of-the-art.

(4) Production and logistics, to get NATO and national cognizance of the production problems of the airplane.

(5) Tactics and techniques, to guide the initial planning of the SHAPE tactical trial program. This program would use 30 of the winning aircraft to develop tactical roles and missions for the weapon system.[179]

By early 1957, after some two years of prototype development, support for the NATO LWSR project among the various NATO nations had begun to slip. By that time few NATO nations were interested in the project, while some were flatly against it. Even though no public criticism had been directed at the program, officially, several defense ministries had informed NATO that unless the program was revised, they wouldn't be interested in participating. As is almost inevitable with so many nations participating, complaints were heard that the program had been ill conceived, and that the original specifications laid down by NATO for its LWSR fighter were not realistic.[180]

When the competitive selection process got under way in the fall of 1957, it was still felt by many that the competing prototypes did not represent aerodynamically or operationally the developed version that was needed to perform the mission. However, construction of a new series of prototypes would delay the program considerably and not necessarily be any more successful in obtaining a concensus. As such, NATO opted for a quick fix,

altering the program by allowing the previously considered, but dropped, Etandard IV and Baroudeur to enter the competition, bringing it up to five prototypes—four French and one Italian.[181]

Consequently, by the summer of 1957, five prototypes of different design had been constructed in France, and Italy and were ready for evaluation to permit selection of the best design for common manufacture. In September 1957, the five rivals met for evaluation trials at the Centre d'Essais en Vol at Bretigny-sur-Orge in France.

The five competitors included the three specifically designed and developed for the NATO competition: the Breguet Taon 1001, the Dassault Etendard VI, and the Fiat G-91; all three being powered by a Bristol Orpheus 3 turbojet. These were joined by the two other French aircraft of which the producers felt were also capable of meeting the requirement; the Dassault Etendard IV (a re-engined Etandard VI) and the Sud Aviation Baroudeur, both of which were powered by the more powerful SNECMA Atar[182] engine (the French feeling that the British Orpheus did not produce enough thrust).

AGARD was designated to monitor the competitive trails. A team of test pilots from the U.S., UK, FRG, France and Italy conducted flight tests and evaluated the planes. The French projects were reportedly technically superior, but other criteria were to prevail.[183]

The Italian entry — considered by some to be basically a scaled-down version of the North American F-86K Sabre — had several immediate advantages, one of

which was the available F-86 production line.[184] More importantly though, the Fiat G-91 had a clear advantage in terms of development schedules, to the point where, in July, 1957, the Italian government went ahead with an order for 27 pre-production aircraft. The first G-91 prototype made its maiden flight in August 1956, seven months ahead of the Dassault Etandard prototype, and almost a year before the Breguet Taon. Although suffering a number of setbacks, the most serious of which was the elimination of aeroelastic vibrations which had, in February 1957, led to the destruction of the first prototype, the intensive series of tests went forward.

The chairman of AGARD, in a private opinion, recommended the Italian entry, the Fiat G-91. After a number of leaks and the protest of the French delegation to the Standing Group in Washington, D.C., SACEUR announced in December, 1957, that the G-91 had been adopted as the standard lightweight tactical strike reconnaissance aircraft for employment in the European Theater of NATO.[185] The G-91 represented an aircraft which included an Italian airframe, a British engine (the Bristol Orpheus), French undercarriage, and Dutch electronic equipment.

c. Follow-through by the member nations

In the summer of 1958 an experimental international squadron equipped with the G-91 carried out tactical tests in Italy. Trials were then moved to the NATO central European area where the experimental squadron trained with AFCENT forces, and consisted of pilots and ground crews from France, Greece, Italy, Turkey, and the FRG.

By the time the Italian production line closed down in 1977, some 756 G-91's were built including prototypes and pre-production models: the FRG procured 482 and Italy 262; while the U.S., as well committed to procure some 50 with MAP funds (though originally destined for Greece and Turkey they were in fact bought by the Luftwaffe, which in turn eventually transferred 48 to Portugal). France refused to buy any. In addition to production in Italy of some 428 of the aircraft (262 for Italy, 186 for the FRG) some 318 were produced under license in the FRG for the Luftwaffe. The Bristol Siddeley Orpheus engine was built under license in Italy, by Fiat and in the FRG by KHD. The G-91 entered operational service with the Italian Air Force in 1961 and the Luftwaffe in 1962. In 1967 and 1968 the Luftwaffe transferred some 48 of its G-91s to Portugal, thereby equipping a third NATO ally.[186]

There are three basic versions of the Fiat G-91: the G-91R; the G-91T; and the G-91Y. The G-91R, which first appeared in 1959 kept the tactical support features of pre-production aircraft, but were also installed with cameras to provide for photographic reconnaissance. Fourth-eight of the R-1, first of four sub-series, were produced in Italy for the Italian Air Force. The second was the R-3, a series expressly designed for the Luftwaffe with more powerful armament, the installation of two wing mountings, and improved avionics. Fifty G-91 R-3s were built in Italy and 294 in the FRG. The Luftwaffe also received 50 of a third sub-series, the R-4, which had been originally destined for Greece and Turkey. The R-4 was essentially the same as the R-3 except for the armament. The last production sub-series, the R-1B, involved 50 aircraft.[187]

The second basic version was the G-91T, a trainer with structural modifications and a two-seat cockpit. The first prototype flew in May, 1960. The G-91T was built in two sub-series 99 T-1's for the Italian Air Force and 66 for the Luftwaffe (22 of which were built by Arge 91 in the FRG).

The last variant was the G-91Y, which first flew in December, 1966. Sixty-five of this variant were built for the Italian Air Force. These were substantially redesigned and fitted with two General Electric J85 turbojets, the modifications leading to the advanced development of the airframe.[188]

Even though the original expectations of a production run of 1,000 aircraft in several NATO countries was never realized, the support of the U.S. during development, and the FRG during production, contributed to the project's being at least a partial success. If the program can be criticized for being overly ambitious this is because it mistakenly assumed that NATO authority and solidarity accounted for much more than they actually did vis-a-vis national sovereignty. Whether a nation supported, or did not support, the project was simply a function of its own perception of self-interest at that time.

The FRG's willingness to procure the G-91 is not all that astonishing in light of her recent entry into the Western Alliance, the need to nurture the goodwill of her European neighbors and the exemplary conduct this called for. Additionally, with an only recently revived aerospace industry that had been dormant for 11 years, and having no competitive prototype herself, the FRG needed production programs as a step toward reconstruction. The G-91 was built under license from Fiat in the FRG by a manufacturing organization

called Arge (Arbeitsgemeinschaft) 91 consisting of Dornier, Messerschmitt (now part of MBB) and Heinkel (absorbed into VFW in mid-60's and then into MBB in late 1980). Within Arge 91 Dornier was the lead firm, assembling, testing and deliverying the G-91 for the Luftwaffe. The 48 G-91's provided to Portugal on aid terms in 1967-8 were first overhauled at Dornier prior to delivery to Portugal.

Although the 50's was the decade of American largesse, with the U.S. funding much of the development, through MWDP, it was understood from the beginning that this was to be a European industrial effort to be procured by the European NATO governments only, be it with U.S. assistance. Unfortunately though, the U.S. reneged on the 50 aircraft order for Greece and Turkey, as a consequence of the 1961 gold flow crisis and the policy shift that followed.

In spite of the fact that British firms had submitted several designs and the British Orpheus turbojet engine was included in the design of most aircraft proposed for the LWSR program (and all three of the finalists), the UK, having her own competitive aircraft, ordered none.[189]

One of the U.K.'s original contestants rejected for the NATO competition went on to development and eventually into production, the Folland Gnat which was also powered by the Bristol Siddeley Orpheus engine).[190]

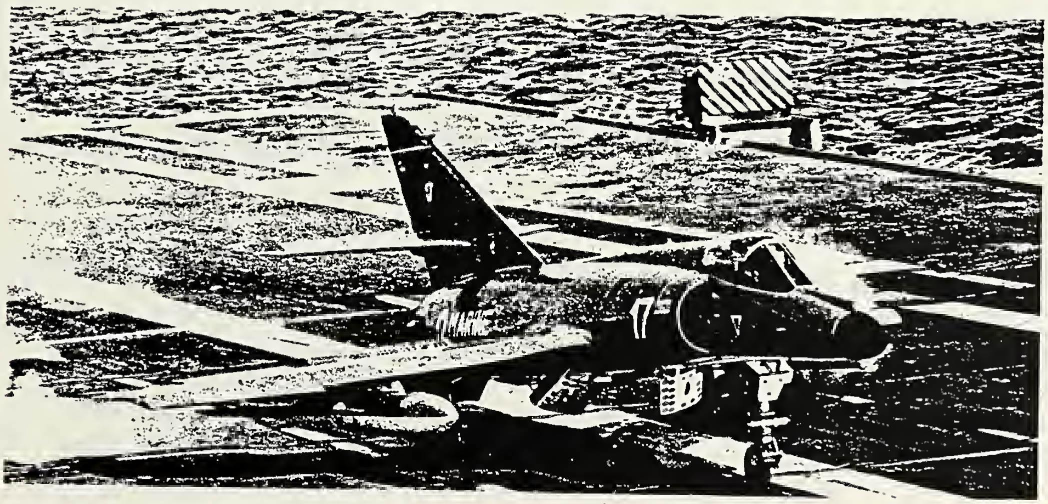
The Gnat, though originally conceived as a light single-seat fighter of no great sophistication or cost, evolved into an advanced trainer for the R.A.F. and the Indian Air Force, with a secondary ground support role.[191]

The project started in 1952-3 and was developed privately without official backing, the first prototype flying in August, 1954. Although the R.A.F. was not originally convinced of the aircraft's validity as a combat model, it did eventually order six prototypes to undergo operational trials. In September 1956, several months into the trials, the Indian government went ahead and signed a contract for manufacture of the aircraft under license, to be carried out by Hindustan Aircraft Ltd. Some 250 aircraft of this version were eventually produced in India, after which an independently developed advanced variant, the Gnat II went into production and was first delivered in 1977.[192] Several years after the original Indian order, the R.A.F. went ahead with an order of the aircraft, eventually ordering a total of 100, entering service in 1962 as the R.A.F.'s advanced trainer. As of 1980 they are being phased out of service, being replaced by the British Aerospace Hawk.[193]

Meanwhile, the R.A.F. and Royal Navy had continued to equip themselves during the second half of the 50's with their own new fighter/strike aircraft, including the Gloster Javelin, the Supermarine Scimitar, Hawker Siddeley Sea Vixen, the Hawker Siddeley Bucaneer and the English Electric Lightning.

France's Breguet 1001 Taon and Dassault Etendard VI were among the final three contenders, and France was bitter over the ultimate selection of the Fiat G-91 to be the NATO LWSR aircraft. It was claimed in France that the Breguet Taon had been a better aircraft; that there had been last-minute changes in competition requirements; that, since no competitor had fully met the NATO requirements, all three finalists should get the NATO label; and that the American government had provided strong pressure for selection of the G-91 for

Cinquante mètres devant, c'est la mer! (Marine Nationale.)



reasons which had less to do with the military merit of the aircraft than with the political, economic, and social situation in Italy. The French representative on the evaluation committee disagreed with the committee's report and choice. Following the failure of an attempted compromise involving a selection and ordering of both the G-91 and one of the four French entries, France, which had been expected to be a heavy customer, refused to procure any G-91's.[194]

A variant of one of the two French prototypes designed and developed especially for the NATO competition, the Dassault Etandard VI, was selected by the French Navy for use on its aircraft carriers. The variant was designated the Etandard IV and was one of the two French aircraft that were allowed to enter the competition at the last minute, having been re-engined with the SNECMA Atar turbojet.

Meanwhile the Armee de l'Air had continued to procure the Dassault Mystere series in its incrementally improved versions:

- The Mystere II-C fighter-bomber, 180 of which were built starting in 1954, the aircraft being a direct development of the Oaragan -a philosophy which Marcel Dassault has followed throughout his career;
- The Mystere IV-A, a completely redesigned aircraft, 483 of which were built through October, 1958; and;

- The Super Mystere, a direct offspring of the Mystere IV-B, 180 of which were built between 1955 and October 1959.

In October, 1960 the first production model of the follow-on Dassault series flew, the Mirage III-C, an aircraft for which total orders stood at 1,747 aircraft through 1977.

d. Conclusions

The LWSR figher project can only be qualified as a marginal success due to the lack of any follow-up orders for the NATO selected aircraft from the national governments of the losing competitors—the UK, and especially France.

However, considering the fact that the LWSR project was somewhat of a crash operation to secure an aircraft quickly and cheaply, and was procured for three allied air forces, it can be considered a success in this sense.

Vandevanter, in his 1964 Rand study used the LWSR project to illustrate two significant obstacles to the success of international competitive common selection and common production schemes.

> The first of these is the problem of judging the competition among designs or prototypes. AGARD took on the task reluctantly and was not prepared to cope with the political commotion that surrounded the competition. Nor could any committee whose delegates reflected national positions have been expected to reach a unanimous decision, given the opposing interest of Italy, France, and Great Britain.[195]

The second critical limitation is the simple fact that the member nations are not ipso facto committed to procuring (through direct purchase or licensed production) the winning system. As in any NATO weapon system project it is the nations that contract for the given system.

> Leading competitors among the nations have been unwilling to pledge themselves in advance, and even in case of an understanding, some have reneged on such a commitment. Understandably, nations will not commit themselves at the design stage to buying an untried weapon, and the discussion of sales and purchases, therefore, normally is deferred until the prototypes have been tested. By that time, however, the nations involved in the competition have a strong vested interest in their own candidates. The lack of firm pledges that would guarantee the sale of a given number of the winning models makes the success of any project uncertain to the very end.[196]

In addition to portraying the serious constraints of international competitive selection for standardizing weapon systems within NATO the project represents a transitional phase between the earlier forms of collaboration represented by unilateral development (wherein one national industry developes a system for its own government) followed by license production where feasible in procuring nations, and what were later to become truly transnational projects.[197] More specifically the Fiat G-91, as the winning prototype of the NATO Lightweight Strike Reconnaissance Fighter Competition represented:

- The development of a system to specifications drawn-up by an international military staff;
- Development under combined U.S. and Italian funding;
- Development by an industrial team consisting of an Italian firm as prime contractor for the air frame, a British firm for the engine, with the former incorporating French and Dutch equipment and avionics as well;

- Selected through an internationally supervised competition (despite the high defection ratio), followed up by testing by an international team of pilots;
- A system that was produced in both Italy and the FRG (in the latter case under license), and;
- One which entered the inventory of three allied air forces.

e. Lessons Learned

(1) When the NATO LWSR fighter project was launched in the mid 1950's, the project enjoyed a unique set of circumstances which, though helping to make it a partial success, would not allow it to serve as the model for future collaborative projects, as had originally been intended. These favorable circumstances included two principal supporting elements; (1) the U.S. was contributing financially on a massive scale to help a dependent Europe to rebuild its industrial and defense capabilities so as to better sustain itself, and (2) the FRG was entering NATO and was in need of systems not only to immediately equip its forces, but also to produce under license, so as to resuscitate its aerospace industry which had virtually no recent designs of its own. The NATO LWSR fighter served as a transitional project in that it began the move away from unilateral development followed by the choice of either direct purchase or licensed production, towards one of transnational enterprise. Therefore, although the circumstances were only temporarily favorable to such a venture, they did spawn a project which was not only transitional in nature, but provided 2 crucial lessons learned. The next time around another tack would have to be taken.

(2) Though this may seem overly obvious in hindsight, the NATO LWSR fighter project provided, but this time at the project level, another reminder that in peacetime, and especially on its civil side, NATO was not a supranational organization. The competing prototypes had taken on a national identification, while selection had to be made on the basis of unanimity among an ad hoc committee including representatives of the three contestant nations, the UK, France, and Italy. The committee chairman broke the impasse with his recommendation, along the lines of the majority opinion, in favor of the Italian entry, the Fiat G-91, but this held no weight with the French and British, who either screamed foul and/or proceeded to ignore the decision. Expecting to reach a unanimous decision on selection among a group of sovereign customer nations two or more of which themselves have entries among the contestants, is just "whistling Dixie."

(3) Not only is reaching unanimity under such circumstances virtually impossible, but the consequence of a lack of it means that the out-voted sovereign nations are not likely to commit themselves to follow through on a majority decision that is contrary to their national positions. Furthermore nations can not be expected to commit themselves in advance to procure an untried weapon system for which their investment and participation in managing has been minimal, and which may not adequately respond to their own current national perceptions of what is required vis-a-vis cost, performance, schedule or industrial participation.

2. THE NATO ATLANTIC MARITIME PATROL AIRCRAFT

The Atlantic Maritime Patrol Aircraft represents NATO's second weapon system project, the precursor to NATO's first set of armaments collaboration procedures and the first successful joint development project (and therefore the first of those projects falling into what is classified in this paper as Mode #3). Under the design leadership of Breguet the system was developed jointly by an industrial team of French, German, Dutch, and Belgian firms under contract to a governmental consortium including these four firms' governments plus the U.S.. Though not members of the industrial consortium, UK and U.S. firms also had a major role as equipment suppliers and licensors. The U.S. and Belgium never ordered any of the aircraft, but Italy later reversed its initial position, and ordered 18 aircraft bringing the total aircraft order for the four customer navies up to 87..

a. A NATO Project is Launched (December, 1956, to January, 1958)

(1) Statement of the requirement and agreement on operational characteristics of the system

The Alliance's need for a new maritime patrol aircraft was highlighted at the December, 1956, Ministerial Meeting of the North Atlantic Council (NAC). The Lockheed P-2 Neptune which had previously been provided by the U.S. through the Mutual Defense Assistance Program (MDAP) to many of the European navies, would need a successor. In early 1957 the problem was turned over to the NATO Defense Production Committee[198] (DPC) for study. The DPC next convened a

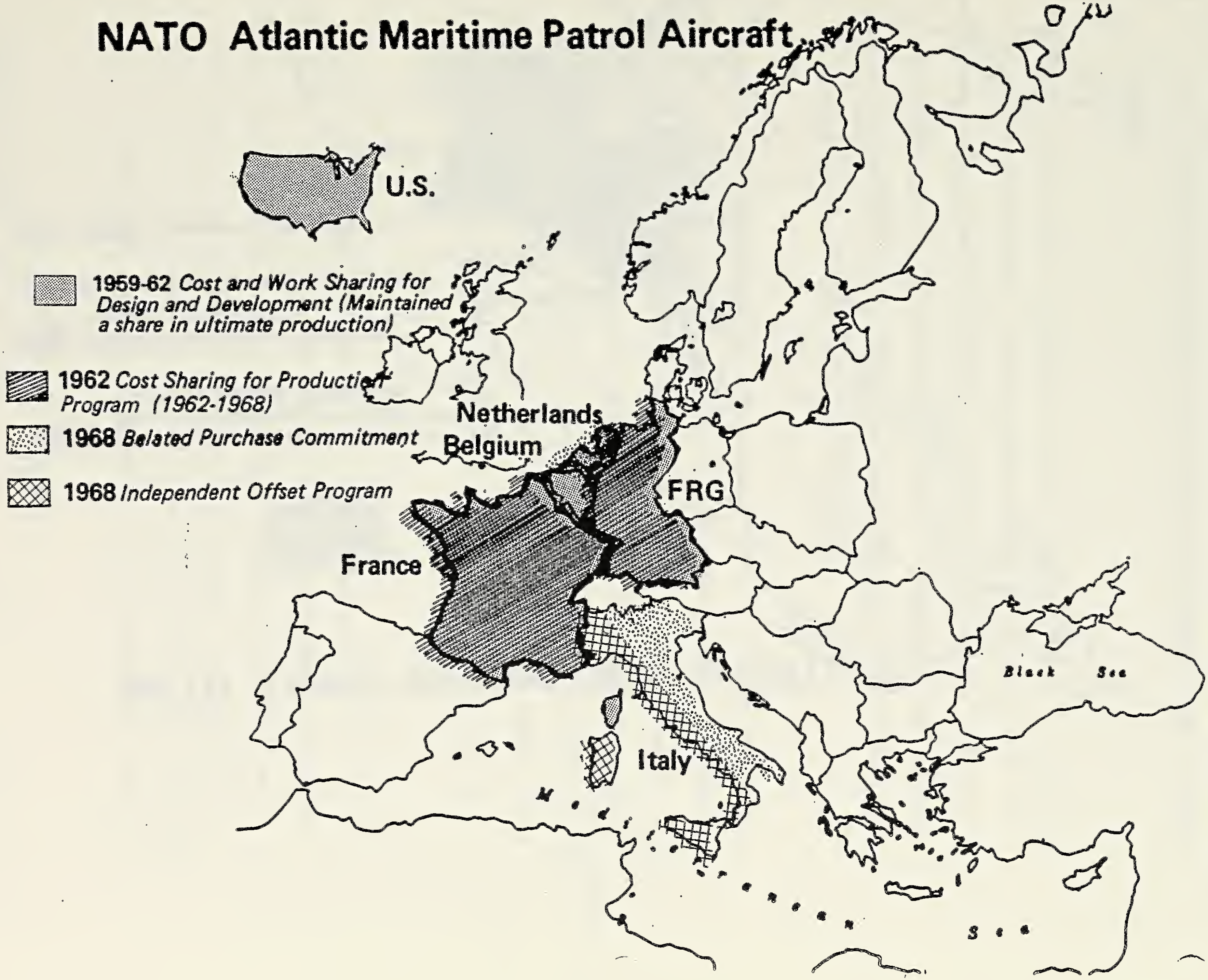
group of experts from 13 allied nations, AC/126,[199] which held its first meeting on

April 26, 1957. Very little working experience had been gained previously at this time to guide it in its working methods. The Group of Experts closely cooperated with and were supported by the NATO International Staff/Secretariat, and was not reluctant to secure the assistance of the various National Technical Directorates or the industrial firms themselves. AC/126 was instructed to inquire first of the NATO Military Authorities (i.e. the Military Committee via its its executive agency the Standing Group)[200] for their formulation of the basic military requirements, and in the light of such information to convert them into operational requirements. Specifically, the Group's mission was:

- first, to define the operational characteristics of the aircraft;
- next, draw up the appropriate technical specifications for the guidance of industrial concerns, with the purpose of obtaining design studies;
- last, select the best design and submit a plan for a developmental production program.[201]

After exploring every possible alternative it had become clear that a completely new aircraft would be needed. AC/126 then drew up the characteristics of the aircraft which received the unanimous approval of the 13 national staffs concerned within 3 months, by January, 1958.

NATO Atlantic Maritime Patrol Aircraft



NATO Atlantic Maritime Patrol Aircraft

(2) <u>Technical specifications are drawn up, a design competition is organized, and a prototype development plan agreed upon (January, 1958 to January, 1959)</u>

Also in January 1958, a Subgroup on design studies was set up to prepare the detailed specifications. After once again obtaining the approval of the national staffs, the specifications and structural rules were issued to industry through the various national agencies on March 21, 1958, with an invitation to submit design studies by June 21, 1958. Total national orders of between 100 and 200 aircraft were anticipated.

These structural rules for the competition included: the requirement that tentative international agreements be drawn up with at least one other participating nation's industry (i.e., at least a binational consortium) upon which work would be further allocated on a basis proportional to national orders; and a clause was included whereby each supplier of equipment outside the associated nations (i.e., nations placing orders) had to commit itself to license or subcontract major items for production in the participating nations.

Another provision agreed to during the following three months was that the program's executive agency would be the relevant government agency of the nation whose firm was the winning contractor (and therefore the prime contractor), so as to simplify contracting procedures. Also during this interim period of awaiting the industries response, a series of meetings were held in London where, in order to establish a list of equipment from which to

choose for the future Atlantic, all the the participating allied nations presented their most advanced systems. "This was carried out in a spirit of cooperation and competition, of which the objectiveness and openness permitted the Atlantic to incorporate equipment that was unquestionably superior to that of any other aircraft of this kind."[202]

In June, 1958, 20 design studies were submitted by American, Belgian, British, Canadian, Dutch, French, German, and Italian firms.[203] These had been reduced by representing the Hawker Siddeley Group of the UK; Sud-Aviation and Breguet of France. AC/126 made the final recommendation for the Breguet 1150 by a unanimous decision on October 21, 1958.[204]

October to a final selection between the designs of three firms: A. V. Roe Ltd. The Breguet 1150 design was for a conventional twin-engined turbo-prop aircraft with a patrol speed of 315 km/h, a maximum speed of 555 mph, an endurance of 18 hours and a crew of 12. The aircraft was to be armed with a range of weapons including air-to-surface missiles, ASW torpedoes, bombs, and mines.

The Breguet led industrial team also included: A.V. Roe (UK), ABAP (Belgium), Dornier (FRG), Fokker (Netherlands), and Sud-Aviation (France). It was hoped that this teaming arrangement would tend to dilute the impact of loss of the design competition by any one of the national participants. However, following on the heels of its government, the British industrial participant was to drop out several months later.[205]

AC/126 however, agreed to withhold their final recommendation until inquiries had been undertaken into certain design features about which doubts had been expressed. The following month, in November 1958, the Standing Group stated that the projected aircraft would fulfill the NATO requirement. After having received the results of further design studies, the Group of Experts, AC/126, passed on their recommendation for the adoption of the Breguet 1150 to the Armaments Committee. This decision was endorsed by NATO's Armaments Committee in January 30, 1959. The Group, AC/126, was dissolved on the same date having successfully completed the task assigned, but after having made a final recommendation for starting out with a minimum program in 1959, consisting of the research, design, construction, and testing of two prototypes.

> These are as important as the financial agreement itself. Atlantic may be considered a classic case of the "institutional" method of organization, but it was found that NATO sanction was not sufficient to make the partners agree to adopt any of the other's practices completely. Such practices were too much a part of the way of life, of law, and of business in the individual nations concerned. While certain controls must be institutionalized, perhaps those of financial agreement remain the most difficult in the case of Atlantic. It took two months of hard negotiation within AC/152...[206]

(3) Reaching an agreement over project financing (January-December, 1959)

Simultaneously with its dissolution by the Defense Production Committee, AC/126 was succeeded by a new Group of Experts, AC/152, charged with establishing the financial arrangements for the project.

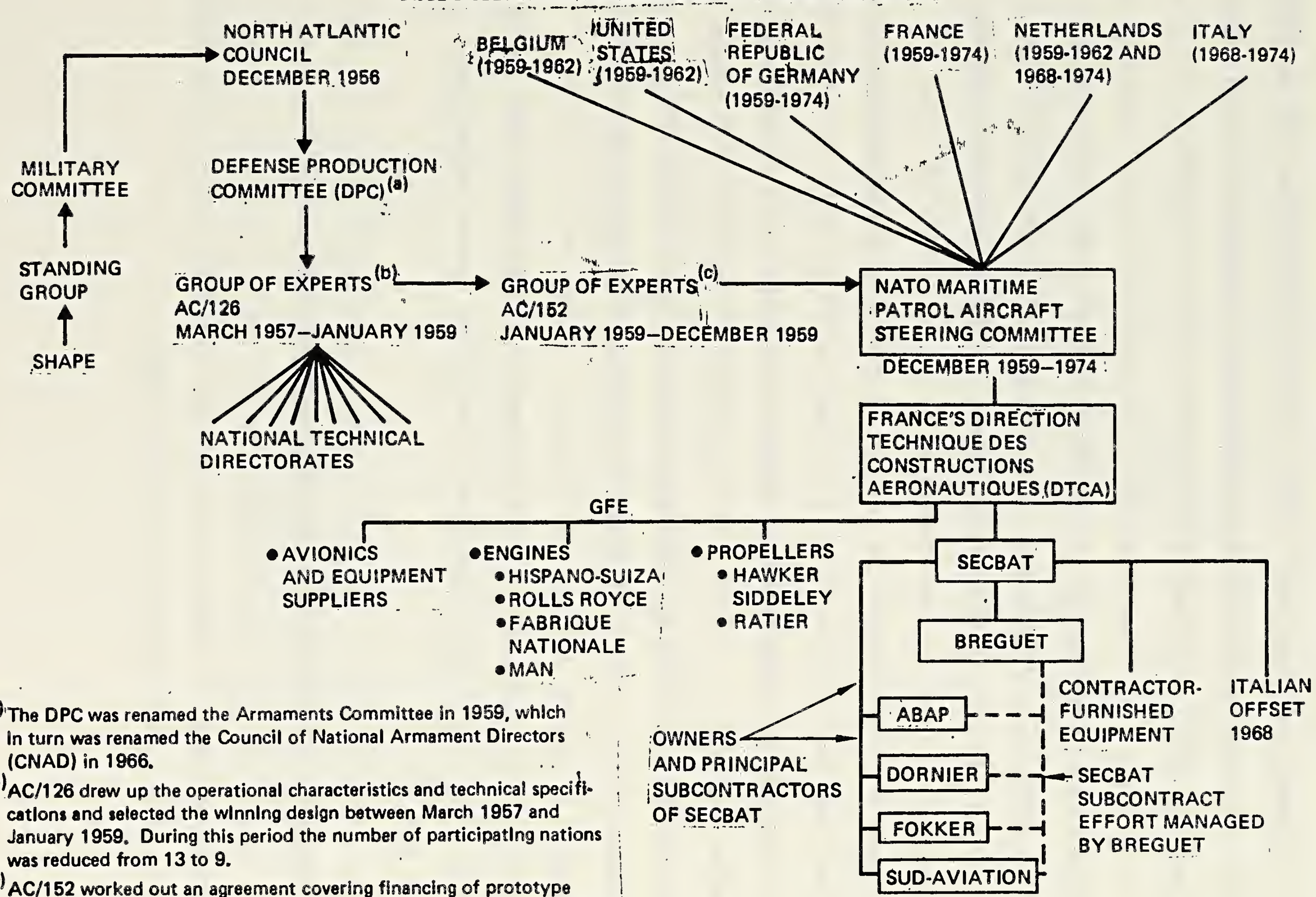
Needless to say, financial practices such as accounting, reporting procedures, comptroller methods and practices, differ from nation to nation and industry to industry in Europe. This meant that, the collaborating nations needed to first find a common, agreed upon set of institutional rules and procedures.

Less than two weeks after the dissolution of AC/126, had been confirmed by the Defense Production Committee on 30 January, 1959, France's Direction Technique et Industrielle de l' Aeronautique (DTIA) had signed the first contract with Breguet as lead firm of the industrial consortium. This contract and initial financing of the project by France alone allowed the prototype phase of the program to be launched, without awaiting the reaching of the international agreement which would eventually assure the financing of the project.[207]

In spite of the program's placing a premium on economy, the original 13 nations quickly found themselves reduced to 5 when the subject of financing came up. The UK and Canada both withdrew from the program in January, 1959. Canada had fulfilled its requirement with its own Argus, and the UK, having lost the competition, announced that it did not need to replace its Coastal Command Shakletons with new aircraft until the 1970's.

Four European countries, Belgium, France, the FRG and the Netherlands commenced ten months of negotiations toward an agreement for financing the prototypes, assisted by the U.S. On December 2, 1959, the North Atlantic Consul (NAC) approved the protocol (or MOU) signed between the four European countries covering the financing of the program and its intergovernmental organization. The intergovernmental organization involved the establishing the NATO Patrol Aircraft Steering Committee as the decision-making body that would oversee the execution of contracts by the French government's DTIA. Five days later on December 7, the agreement between the industrial partners from the four nations was signed. This involved the establishment of an international firm, Societe Europeene pour la Construction du Breguet Atlantic

NATO ATLANTIC MARITIME PATROL AIRCRAFT



(a) The DPC was renamed the Armaments Committee in 1959, which in turn was renamed the Council of National Armament Directors (CNAD) in 1966.

(b) AC/126 drew up the operational characteristics and technical specifications and selected the winning design between March 1957 and January 1959. During this period the number of participating nations was reduced from 13 to 9.

(c) AC/152 worked out an agreement covering financing of prototype construction between January and December 1959. During this period the number of nations was reduced from 9 to 5.

(SECBAT). SECBAT was headed by Breguet but also included Arbeitsgemeinschaft Seeflug (Dornier and Siebel Werke, FRG), Fokker (Netherlands), ABAP (a Belgian industry team comprised of Fairey and SABCA) and Sud-Aviation (France) as the principal industrial participants of the four participating nations.

And finally, later in December the agreement between the four Associated Nations and the U.S. was signed. This provided for financial assistance within the provisions and framework of the U.S. Mutual Weapons Development Program (MWDP). The U.S. contributed 11.5 million dollars of a total requirement of 19 million for the initial financing of the prototype phase.[208] The four financing European countries divided up the remainder in proportion to their provisional requirements: Belgium (6), France (70), the FRG (18), The Netherlands (20). Portugal, with a provisional requirement of 12-24, and Norway with a requirement for 6 were not part of the co-funding and co-development effort. The six European nations had a collective provisional requirement of between 120 and 144 Atlantics. Though the U.S. had no intention of buying the aircraft for its own use, it evidently indicated at the time that it intended to purchase Atlantics for Norway and Portugal through MAP.[209]

b. Chronology of Major Events during development and production

The prototype phase, or Phase I, was launched in February 1959 and in October 1961 the first prototype made its initial flight.

Phase II began in early 1961. Phase II or the "transition" stage, was both developmental and production in nature, since the funding was considered in some countries as development funds and in others, as production funds. This phase was also once again initially financed by France until the actual share fixing agreements within the framework of another protocol were signed. The U.S., Belgium, and The Netherlands dropped out of the program at this time, in June 1962. This left only the winning prototype nation, France, and once again the FRG - reminiscent of the NATO LWSR fighter project.

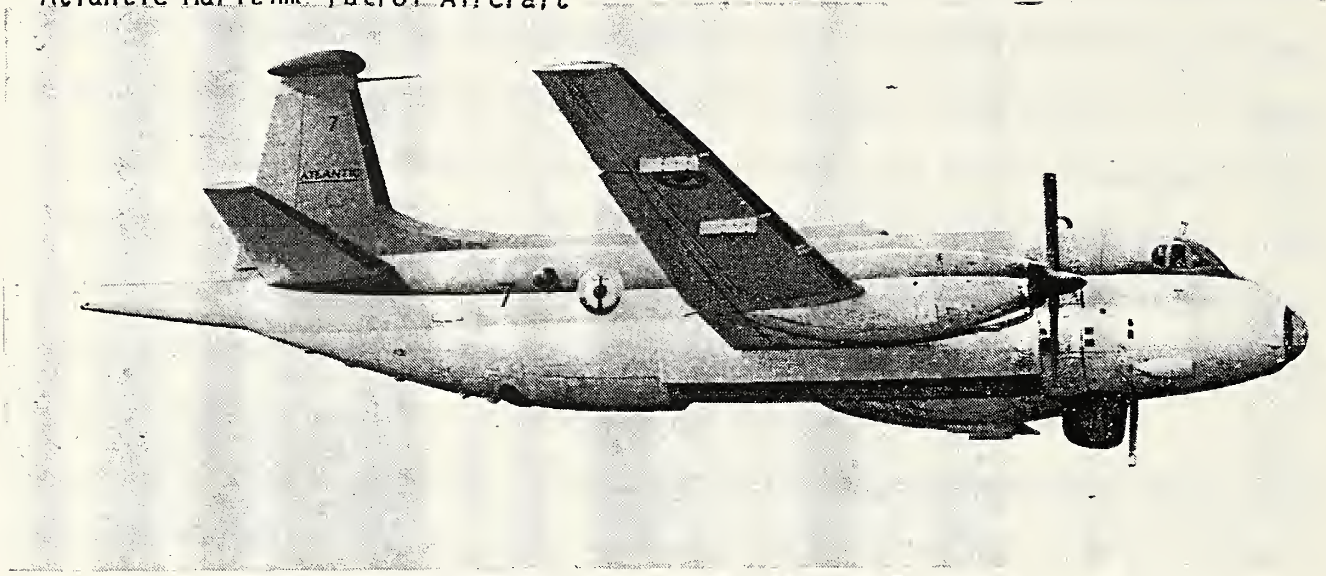
Phase II specifically involved:

(1) a third protoype (not originally envisioned in the first agreement);
(2) a complete set of production tooling;
(3) construction of full-scale static and fatigue models;
(4) and the initial production prototype aircraft.

Then came the six series production phases and their corresponding protocols covering financing:

(1) Phase III, the procurement of additional tooling, and the financing and procurement of production test installations, the preparation of documents and handbooks, and similar logistical and technical support functions.

Atlantic Maritime Patrol Aircraft



Source: Fokker

Norwegian P-3B Orion

Source: International Defense Review

(2) Phase IV, acquisition of 2 flight simulators through competitive selection with the final decision for production contracting being made by the Steering Committee.

(3) Phase V, the first production batch of 40 aircraft (20 for France and 20 for the FRG), plus spare parts and associated ground equipment (the Steering Committee, once again, had the final say on these contracts awarded by France's DTIA).

(4) Phase VI, the next batch of 20 aircraft (all 20 for France).

(5) Phase VII, a third simulator.

(6) Phase VIII, would assure the financing of the common logistics organization, Centre International de Gestion du Materiel Atlantic (CIGMA).

By 1964 the possible sales to Portugal and Norway[210] had evaporated as well. In the summer of 1964 the UK showed belated interest in entering the program, and spoke of an order of up to 50 Atlantics. However the new Labor government, elected in the fall, decided instead to procure her own system of modified Comets, the Nimrod. The 60 plane order of France (40)[211] and the FRG (20) was all that was left of the original estimate of between 100 and 200. As a consequence of these remorseless withdrawals considerable bitterness had been building up in France. In spite of this, the program was remarkable in that it was consistently ahead of its timetable and kept within its financial ceiling throughout.[212]

The first two production aircraft were delivered to France and the FRG in December 1965, and were followed thereafter at the rate of 2 per month. In July 1968 shortly after the last of the 60 aircraft produced for France and the FRG rolled off the assembly line, the Netherlands reversed her previous cancellation, and ordered 9 Atlantics to replace its Grumman S-2A's and Lockheed P-2H Neptunes (and thus rejoined the NATO Patrol Aircraft Steering Committee as a full, voting member). Competing with the Atlantic for the Dutch order was the Lockheed P-3B Orion.

The Dutch order put the Atlantic back in the running for a pending Italian buy since the Atlantic production line had been due to be completely phased out by the time the Italians made their selection. The Italians selected the Atlantic over the Lockheed Orion as well (and the option of assembling the Orion in Italy under license), some 3 months after the Dutch order, placing an order for 18 aircraft and bringing the total order for the Atlantic up to 87. Italy also joined the Steering Committee and a certain percentage of the production work was transferred to Aeritalia. The production line was finally closed down in mid-1974.

As of the fall of 1981 the Dutch and Germans had each lost one Atlantic, and the French two.

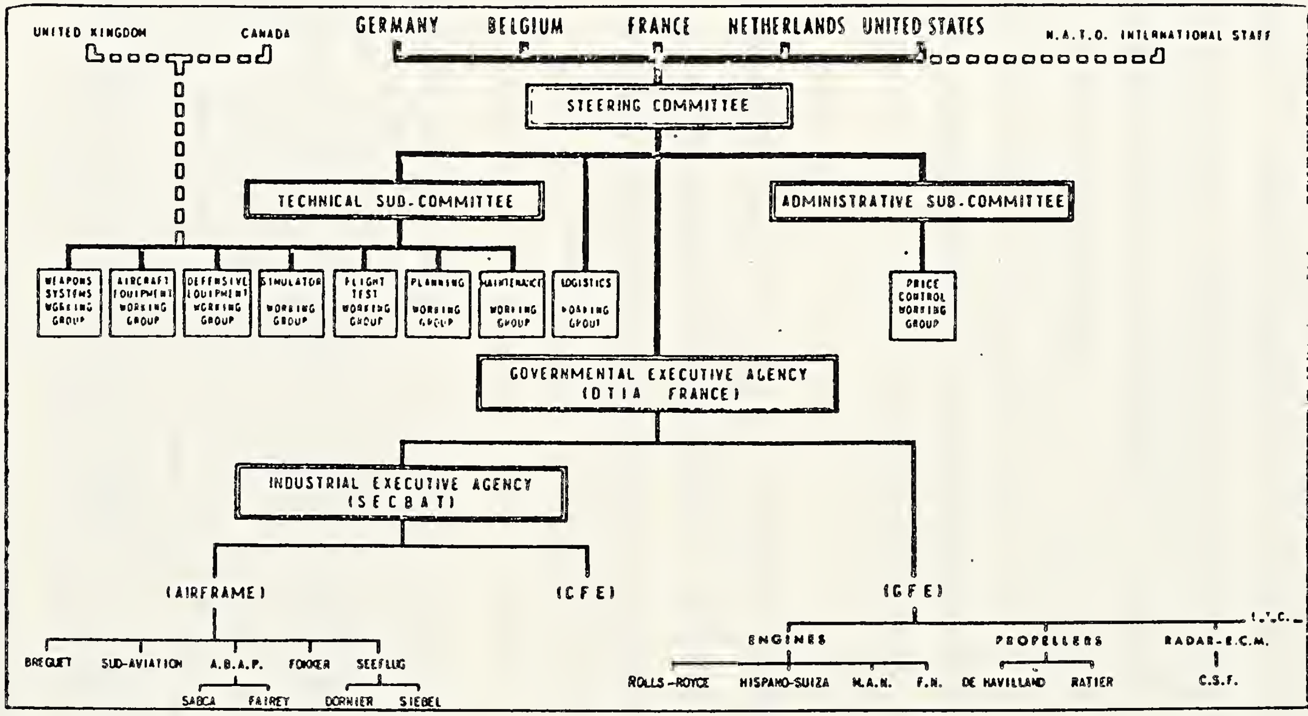
c. Governmental Organization The Associated Governments[213] were held equally and jointly responsible for conducting the project within the framework of the philosophy, principles and rules laid down in the agreement (MOU) approved by the Counsul in December, 1959, NATO Document C-M(59)98.

As the first inter-allied weapon system project for which design, development and production would be carried out on an integrated basis, there were no direct precedents. The nearest thing to a precedent was the NATO Infrastructure Program in which an international committee delegated executive authority to national agencies for the various projects. It was decided that for the Atlantic responsibility for supervising the project would be vested in a Project Steering Committee to which the 4 Associated Governments and the U.S. would delegate their powers. The actual execution of the work was placed under the supervision of the French Government's Direction Technique et Industrielle de l'Aeronautique (DTIA).[214] As we will see in later chapters this model has been widely adopted since.

The project organization represented a weapon system management approach similar to the U.S. practice. Responsibility and authority however, were vested in a five man committee rather than in a single executive as is the U.S. method. As for its specific structure, it

> ... was not a prescribed organization handed down by any one national or international authority. It was arrived at pragmatically by the active participants. The method they arrived at collectively had to be digested individually by the various national administrations. This helped to curtail their natural eagerness to retain the entirety of their rights, their favorite methods, their habits, and pride, among other national obstacles. They obviously retained their national political sovereignties, for in no place does the record reveal an an instance of complaint in that touchy quarter. In short, they experienced a successful achievement through true cooperation in an economic/productive endeavor while remaining quite sovereign individually.[215]

The Steering Committee was given broad policy and directional powers over all phases of the common effort by the governments concerned. Such powers



Source: Bloch

included: the responsibility to work out financial arrangements; approval of contracts, coordination of orders when placed; control over industrial materials and assets, and the preparation of recommendations that flowed up and down the hierarchy of NATO, and to the nations and industries engaged in the project. It was chaired by a national representative, and rotated every six months among the five nations. Its meetings were initially held at least once a month, all decisions being taken unanimously. Decisions were prepared by two subcommittees, one Technical and the other Administrative. The Steering Committee also set up Ad Hoc Working Groups which were dissolved as soon as their respective tasks were completed. In this respect the Steering Committee was authorized to create organs and to delegate its authority, but always with the power (and a often practiced one) of dissolving such organs.[216]

Each of the 5 national representatives on the Steering Committee possessed fully the governmental authority of his country within the limits fixed by the international agreement C-M(59)98 governing the program. Each national representative had the double responsibility of: representative of his country in the program's highest decision making body; and coordinator in his country of all activities relevant to the program.[217]

> Contributing to its effectiveness was the ...fact that each of the five national representatives in the Steering Committee was made directly responsible to the ministerial level, thus holding a very special position outside his normal functions. They occasionally had difficulties in their own countries, but at least the Committee saw to it that they returned home armed with answers as to "why" a certain decision had to be made, or "how" a certain position had to be accepted."[218]

The Steering Committees members were chosen for their qualities in technical, financial, and legal fields, their ability to speak languages fluently, and more importantly, as the French member, Captain Bloch, so aptly put it, "to speak to people's hearts." Moreover, the designated executive representatives were appointed for the duration of the project. Their long tenure gave them added confidence and experience, and that experience provided the ability to arrive at speedy decisions.

In commenting on the program's success, an Aviation Week & Space Technology article listed several contributions, number one among them being the Steering Committee.

The...."minimum number of persons on the projects steering committee, the long tenure of most members, and an agreed principle that decisions must be made with a minimum of delay. 'Our secret,' one member says, 'is that we've been keeping politics out of this by moving fast.'"[219]

The article went on the quote French Navy Captain Rene Bloch, the French member of the Steering Committee, the permanent Chairman of the Technical Subcommittee, head of the DTIA section concerned with the program, and a participant in the program since its inception. In his evaluation of the program's success he observed that:

...the more people assemble, the more lobbies and the political elements enter the picture, the less objective the competition will become, the more

difficult a choice will be and, therefore, the less successful the result will be. As we all know, the real difficulty always lies in the basic opposition which each government experiences between its international defense imperatives and its national economy requirement...[220]

Bloch made a similar comment when referring to important lessons learned from the program, with regards to the Group of Experts, AC/126 stating "...the fewer the people in this type of exercise, the less leaks you will have, and as such less political pressure capable of paralyzing further efforts."[221]

As Captain Bloch summarized in his Royce lecture, the road to success was not without travail:

> You may be assured, that occasionally we all had our difficulties within our own countries. Furthermore, you are probably well aware of what it may mean to have seven countries adopt the same equipment; take, for instance an altimeter: some want meters, some want feet, some want the zero up on top, some want it down below, and when one attends mockup meetings, one usually comes out with a swollen head and a half-doubt on whether the fate of the world or the success of a submarine attack really depend on the zero of an altimeter... and when it came to agreeing on one and the same radar, or worse still, an only set of administrative regulations, the redtape snake pit would break loose in all five countries: so we had some really desperate moments.[222]

A centralized logistics organization, Centre International de Gestion du Materiel Atlantic (CIGMA), was set up near Paris at Velizy-Villacomblay, instead of utilizing the recently formed NATO Maintenance and Supply Organization (NAMSO) at nearby Chateauroux.

In the area of trade, tariff and tax barriers the governments and industrial concerns agreed to apply the most favorable tax and customs treatment to the project that was compatible with the means adopted to implement the project. This involved a harmonization of national trade arrangements with each other to reduce charges and simplify the international movement of goods.[223]

The governments were also successful in their having established for the project standardized logistics, language, measurement units and tools. Overcoming national differences in these three vital areas, the Atlantic was produced using the English language throughout for all nomenclature; the metric system for all numerical units and indicators; and its own, standardized logistic support system.[224]

d. <u>NATO Contracting - the case of the Atlantic</u>

In order to carry out its decisions, the policy-making Steering Committee needed a governmental executive agency which would let industrial contracts, supervise their execution, and arrange for testing and acceptance of the equipment.[225]

As with the NATO Infrastructure Program, a basic premise of the Atlantic organizational approach was to make use of certain existing organizations, both governmental and industrial, to direct the program. It was felt that duplication of existing governmental organizations should be avoided as it would only lead to the creation of new jobs, to lengthy processes of breaking in new administrations, and for industry having to reorganize itself accordingly.

It had been decided, therefore, very early in the project, even before the Group of Experts had selected the Breguet design, so as not to burden the program budget with the additional expenditure and somewhat doubtful efficiency which would have resulted from setting up a new international administrative body, to nominate for the task, the government agency responsible for maritime patrol aircraft procurement in the country of the winning prime contractor. This resulted in the designation of France's Direction Technique et Industrielle de l'Aeronautique (DTIA) to fulfill the task.[226]

Overall coordination authority was vested in the same person who represented France on the Steering Committee; Capt. Rene Bloch. The French representative was empowered to act for the Steering Committee in routine business with the prime contractor, Breguet. This designation saved a lot of transmission delays and made for prior agreement between the Committee and the DTIA.[227]

On the subject of program costs, a program budget was prepared annually, and approved by the Steering Committee. This document summarized expenditures and, forecast expenditures in the coming year.

An account of all transactions and their corresponding expenses was presented to the Steering Committee quarterly by the DTIA. It was on the basis of these that France was reimbursed every three months by the other participating governments for the expenses it had incurred for the common effort.[228]

As for the pros and cons of working through one nation's defense procurement system Capt. Rene Bloch felt that one of the major lessons learned of the Atlantic project was that this approach was definitely the most advantageous. Quoting from a paper he delivered at the seventh Royce Memorial Lecture in London, entitled "NATO's Firstborn: The Atlantic", in March 1963:

> During the first three years of realization of the programme, as earlier during its evaluation, methods of work had to be defined by trial and error by the Steering Committee. Yet during these same years a number of other NATO projects have progressed with various degrees of luck using other types of organization: NATO Agencies, Coordinating Committees, and so on. Why then is the ATLANTIC so often quoted as having set a pattern for future NATO co-operation?
>
> As long as National Administrations exist—and they probably will last a few more years—the best use should be made of them; that is, one should avoid creating international organizations duplicating the existing national ones, a step which would only lead to the creation of new jobs, to the tedious process of breaking-in new administrations, and to industry having to organize itself accordingly—a lengthy, very costly and rarely efficient way of achieving something.
>
> International programmes on the other hand carry with them, as we have seen, a number of other new problems in the legal, fiscal and administrative fields, but mainly in the realm of economic compensations and of political decisions. Therefore, let us avoid cumulating these true problems with the day-to-day difficulties which characterize each of our national organizations, difficulties such as red-tape viscosity, administrative habits, or even petty personality matters. Therefore, let each government designate, for better or for worse, one man to represent it. Let us give to the small group thus constituted real responsibilities: it will be up to them to clear their problems at national level, seeking the best advice and making sure that they possess all the information they ought to have; let us give them general, but flexible, directives, but thereafter let us trust them.
>
> This may well be the best, if not the only, way to achieve something in a world whose pace and action will not wait for the sempiternal ifs and buts of large international gatherings.
>
> It might take time to have such a lesson digested by the different National Administrations, each of which will probably be eager to retain the entirety of its rights. But only this way shall we be able, while precisely retaining our national sovereignties, to experience in limited fields what true cooperation can achieve.[229]

Bloch's position, however, was rebutted by a Commander Russell S. Eaton, Jr., USN, of the DEFREPNAMA organization which represented the U.S. with respect to the Atlantic program, in a 1965 interview with Charles H. Slater of the Boeing Company. Quoting from Slater's memo:

> When you get right down to it, the ATLANTIC program is essentially a one man show, that one man being Rene Bloch. Bloch is the French member of the steering committee, the permanent chairman of the technical subcommittee, and he heads up the DTIA section concerned with the ATLANTIC program. By occupying so many slots, by having access to more information than anyone else, and by doing his homework very well,
>
> Bloch can essentially move the technical subcommittee and the steering committee in the direction he wishes. The feelings expressed against the way in which the program is managed don't seem to be based so much on the fact that the program is mismanaged, rather on the fact that none of the other nations seem to play a very important role in the program management. Perhaps contributing to this, is the fact that Germany, the most important nation involved, outside of France, has been willing to capitulate on almost every problem. I was told that "it is amazing what the Germans have been willing to put up with".
>
> Symptomatic of the entire situation is . . . . the fact that the steering committee has not yet been able to get a program plan out of the DTIA. Similarly, the steering committee has no right by charter to audit the DTIA. After a lot of pressure to obtain an audit, the French finally agreed to appoint a French government agency, La Cour des Comptes (similar to our GAO) to audit the DTIA ATLANTIC program activities. This is not really satisfactory for a program which is supposed to be international in character.
>
> Eaton said that politics just becomes too important when one nation runs the show, and points to the way in which the BULLPUP program is organized as a much better formula. As you know, the highest body in the BULLPUP organization is a board of directors, which has a charter that spells out each country's commitments to the program. Reporting to the board of directors is a general manager, hired by NATO, who, together with his staff of international people on the NATO payroll, performs the executive function. In the case of the BULLPUP program, the general manager is an Englishman who has a Norwegian assistant. Neither of these men are in any way responsible to their respective governments.
>
> Eaton stressed that they had not had problems on the industrial level, and in fact expressed great admiration for Breguet and their organization.[230]

As we'll see in Chapter 7, for the NATO Hawk, a project that follows closely on the heels of the Atlantic, an approach similar to that of the Bullpup program was taken. For the Hawk it was deemed necessary to create an international project management organization. The reason for these two projects following opposite courses on this issue, though, is readily apparent. The more rational 'non-duplicative' Atlantic approach involved the dominance of one nation that could take the lead, based on its industry having been selected to lead, but also its having the largest share (and a majority until the 1968 Italian order) of the aircraft orders. For the duplicative or 'equity' approach with Hawk, this was not the case. First, no national industry had the lead in production -the developing firm, Raytheon, being in the licensor role of providing technical data and assistance as well as subassemblies, but not a participant in the industrial consortium, SETEL, that acted as prime contractor and licensee for European production. Secondly, among the five European national orders for the Hawk system and therefore the five national industrial shares, the largest was still less than one third. These factors tend to result in a predominance of considerations of equity that would avoid placing one nation's industry and government in a position of unfair advantage. Equity, with its proportional cost-work sharing principle, or 'juste retour' then leads to the requirement to set up outside of a national framework, an international project management office, an entity known within NATO since 1962 as a NATO Production and Logistics Organization (NPLO).

Both of these two strains - the non-duplicative versus the equity approach - are with us today and have also spawned several other approaches since. These

include primarily: the Anglo-French Projects Committee approach, and that of the Franco-German Project Office (for tactical missiles).

Phase I of the program cost approximately 10 percent less than expected, primarily because schedules were actually met. The other Phases kept within their budgets as well, thus making the project a success from the financial planning and cost aspects. The Technical Director, Bloch, went so far as to state that, "all in all, this is the first known case where five years after figures were given and four years after work began, the total budget of an operation remains the same."[231]

The contracts were of the fixed price type, a form arrived at for adoption by the program only after thorough study by the Steering Committee of the relative merits of all forms of contracting for defense hardware.

> This impressive contractual activity was carried out in a brief time period without more than one-monthly meeting of the Steering Committee or of each Sub-Committee. In total, on the NATO side, they represented an involvement of fewer than 20 people. Obviously the experts must have done their homework thoroughly to be able to meet so infrequently, arrive at agreement over an impressive number of complex technical contracts, and not waste the members' time in the usual self-educational machinations of committees.[232]

e. The Industrial Consortia

As the program developed during 1959 it became increasingly evident that its scope would be beyond that for which one firm alone as prime contractor, Breguet, should assume full responsibility, subcontracting to all other participants. It was therefore decided that an organization be created by the industrial partners that could make common commitments and assure the proper completion of the project. The initiative for this new direction in the industrial organization was not left to industry alone, being a prerequisite of the Steering Committee for the signing of any future contracts.[233] An "associative" formula was arrived at whereby each firm had its well delineated area of responsibility, while each also oversaw the whole operation through its participation on the Board of Directors of a shell company, Societe Europeene de Construction de l'Avion Breguet Atlantic (SECBAT) established December 7, 1959.[234] Similar to the Steering Committee-DTIA relationship, Breguet, in fact, assumed overall management responsibilities for SECBAT, while remaining under its policy guidance.[235] The costs involved in supporting SECBAT had come to less than 1/4 of 1 per cent of the cost of the project by 1964.[236] The formula adopted for the association was analagous to that set up by entrepreneurs involved in such public works projects as the construction of dams.[237]

SECBAT consisted of the following firms manufacturing the airframe: Breguet and Sud-Aviation (France); Arbeitsgemeinschaft Seeflug (Dornier and Siebel Werke,[238] FRG); Fokker (Netherlands); and ABAP (SABCA and Fairey, Belgium).[239] There was no duplication of production within the airframe consortium, no single part or component being made by more than one firm.

In addition to producing some 25.5% of the airframe value, Breguet had full responsibility for the final assembly and flight testing. Work was divided up proportionally on the basis of the national shares of the expected orders:

Belgium	7.8%
France	57.8%
FRG	19.1%
Netherlands	15.3%

Even though Belgium and the Netherlands had become non-voting members of the government consortium (i.e., the Steering Committee) in 1962 because of no intent to order production aircraft, the industrial consortium was maintained in tact, unaltered until the Italian order in 1968 and its concommitant offset, which involved some redistribution of work to Aeritalia.

Design and development responsibilities within SECBAT broke down as follows:

Breguet - In addition to being project leader, made the forward section of the fuselage;
Sud-Aviation - the outer wings;
Seeflug - was in charge of the rear part of the fuselage, the lower shell, and the tail unit;
ABAP - the engine nacelles;
Fokker - the inner part of the wings and the center fuselage, and;
Hispano-Suiza - The under carriage.

In addition to SECBAT there was the other part of the industrial effort that was contracted for as GFE by the DTIA: the engines, the propellers, avionics and various other military equipment. It had been agreed that every supplier outside of the associated nations (i.e., U.S. and Canada, as well as the UK) had to promise to license or subcontract, major parts manufacture during series production to European member firms.[240] This led to two additional production consortia being set up, one for the engines and one for the propellers, as well as a great deal of licensed production of avionics and equipment.

The engine consortium consisted of: Rolls-Royce (UK) -20%;[241] Hispano-Suiza (France) -44%; M.A.N. (FRG) -28%; and F.N. (Belgium) -8%. The engine, the Rolls-Royce Tyñe was the only part of the industrial effort involving limited duplication, there being two assembly-lines. This was however, because Tyne engine was also being used in a slightly different version for the jointly developed Franco-German Transall. There was one line for the Tyne 21 for the Atlantic in France at Hispano-Suiza, and one for the Tyne 22 for the Transall in the FRG at M.A.N.

The other consortium, the one for the propellers, included Hawker Siddeley Dynamics (UK), Ratier (France) and several smaller subcontractors in the FRG and Belgium.

For the U.S. equipments that were not licensed to Europe, but procurred from the U.S., the DTIA acquired the equipment through Foreign Military Sales (FMS) procedures from the U.S. Navy. Under the terms of the U.S. agreement to

participate in the project, these purchases from the U.S. Navy had to at least equal the funds the U.S. contributed toward development costs.[242]

The hope that the U.S. would order the Atlantic as a replacement for the Navy's Lockheed P-2 patrol aircraft had faded by 1962. Grumman had obtained the license to produce the Atlantic in the U.S., but the USN never showed any active interest in it.[243]

The allocation of the production of the avionics and equipment represented a repartition more in line with actual orders for the Atlantic.

(1) Ten United States' firms were selected for the manufacture of equipments, ranging from flight simulators (A.C.F.E. and General Precision, Inc.), to radar and sonar gear (Collins and ITT), to listening devices and markers (Hazeltine, Kollsman, M.I.T.E., Collins, Airesearch Manufacturing Inc., General Electric and Dalmo Viktor). Many other American equipments were made under license in France.

(2) One Canadian firm, Computing Devices of Canada, provided the Astro-Tracker.

(3) One Belgian firm, COBELDA, provided the doppler navigation radar made under license from Canadian Marconi Co.

(4) Three British firms (Hawker-Siddeley Dynamics, Mervyn Instruments, and Royston) made smoke detection and magnetic registration instruments.

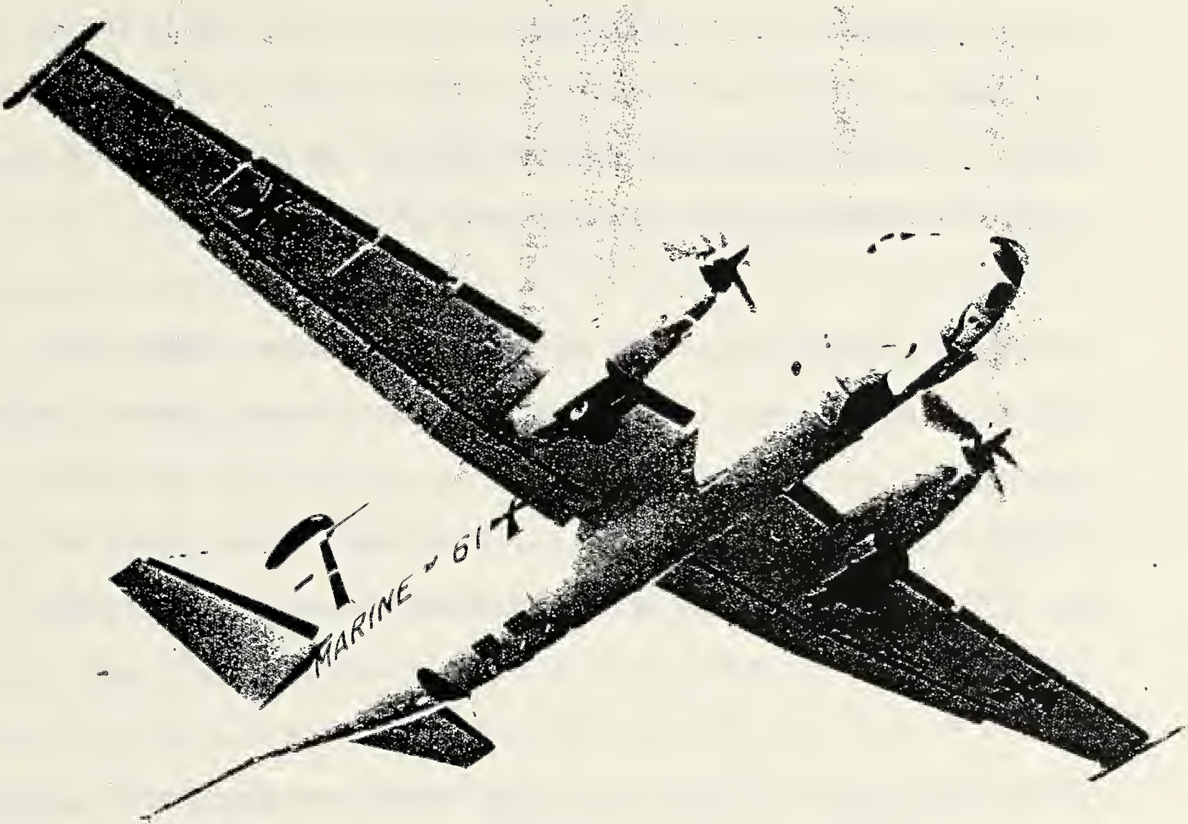
(5) One German firm (Siebel Werke A.T.G.) made the magnetic detector protection dome, and one, Teldix, made some flight control equipment under license from Bendix.

(6) Forty-five French firms made all the other avionics and equipments. Major firms among these included Air Equipment, CFTH-HB, C.S.F., Hispano-Suiza, Matra, LMT/Lorenz, Nord Aviation, SAGEM, SAMM, and Souriau. Also French subsidiaries of foreign based multinationals, such as Zenith, Cannon, and Deutsch were involved. Some of this production was under license from such firms as Lucas, Rotax, Oster/Sunbeam, Teddington, GPI/Kearfott and Sperry.[244]

When the Italian Navy ordered 18 aircraft in 1968, the Italian government demanded an industrial offset package in return. This entailed Dornier's transfering to Aeritalia its work package associated with the lower lobe of the fuselage and Fokker's transfering production of the rear edge of wings, upper and lower air brakes, and the spoiler.

f. Logistics Support: The Bundesmarine

Each of the four NATO navies operating the Atlantic operated through two logistic support channels (Kreislaufe) simultaneously. One was national and the other was international. The international channel involved the aforementioned Centre International de Gestion du Materiel Atlantic (CIGMA) which was co-located at Velizy-Villacomblay (near Paris) with the SC/Aero Tech, the organization which handles all of the French Navy's



German Navy Atlantic

Atlantic Nouvelle Generation (French Navy)

Source: Dornier Post

aeronautical logistics activity. The French government serves as contracting authority for all contracts placed directly by CIGMA as it did for development and production of the aircraft. (This can be contrasted with NAMSA which shares in NATO's jurisdicial personality and therefore is an international authority which can sign as a NATO, not through a national authority as was the case for CIGMA.)

The single greatest difference among the four nations in how they distribute work between the national and international channels stems from whether the individual Navies had an organic depot maintenance overhaul and repair capability. Only the largest user, the French navy, maintains this capability, while the other three navies rely heavily on industry.[245]

To take the example of one of the four navies, the Bundesmarine, work is distributed through the two channels such that the greater share flows through the international one and the balance through the national channel.

The national channel covers all Bundesmarine work (circa 30% of the total) related to the airframe and landing gear along with all German unique avionics and equipment. The channel through CIGMA includes the balance of effort involving all standard avionics and equipment. This latter category amounts to around 70% of the total effort.[246] These two channels are not mutually exclusive, however. For example, the Bundesmarine will buy four wings directly through the national channel,

while contributing simultaneously to a common buy whereby a certain quantity of wings are stocked in France, and available to any four of the participating navies.

Though CIGMA does place some contracts directly with industry (through the French government) for the Bundesmarine, the FRG's Bundesamt fuer Wehrtechnik and Beschaffung (BWB) ordinarily does the contracting with Dornier on CIGMA's behalf while Dornier deals directly with CIGMA for ordering, shipping, etc.

France's S/C Aero Tech implements all configuration control and modification activity on behalf of the Technical Sub-Committee of the NATO Project Steering Committee, the latter being where decisions are actually made. SC/Aero Tech publishes Technical orders (Bulletins Techniques) and Engineering Change Memos (Modification Officielles) for all four navies. Again picking up on the German example, it was the Materielamt Luftwaffe (MatALW) that had responsibility for the Bundesmarine's aeronautical logistic management. The MatALW, as do its Dutch and Italian equivalents, have all forms issued by SC/Aero Tech converted to national forms. The BWB contracted with the German operation and support prime contractor Dornier[247], for this conversion activity, who in turn subcontracted the work to ESG-FEG.[248]

g. Lessons Learned

(1) The product, a standard aircraft, was produced identically for all four user countries and was not an off-the-shelf, remade, or modified version of an existing one. Its organization, which allowed for unusual adherence to prescribed timetables in its joint development and production, plus the efforts of its administrators, resulted in a successful multilateral program, one with a record that would do credit to a purely national effort.

(2) As the Nations got together in the beginning,

> "some sensible precautions and limited membership contributed to a mutual confidence, which, after a year of common effort, had transformed the Group of Experts into a group of friends."[249]

(3) As for tales of lawyers and engineers:

> "Legal snags initially threatened to impose unnecessary complexities on administrative functions, but these were solved shortly after the consortium became operational. Technical problems were easily solved in the beginning, a spokesman said, because engineers were seeking something that would work. Lawyers, on the other hand, were looking for reasons why it wouldn't work."[250]

(4) The financial controls, common organization and procedural rules to which each country and industry agreed were further contributions to the cause of breaking down national habits and pride. The fair and unbiased decisions and allocations of work by the Consortium also impressed the member countries, thereby increasing their faith and confidence in each other.[251]

(5) Like the NATO LWSR fighter project before it, this project benefited from U.S. and FRG support during a period of reconstruction that was about to pass. Though such a project could not expect to benefit from such circumstances in the future, many of the business mechanisms and behavioural adjustments required of these future joint development projects were first tried out here.

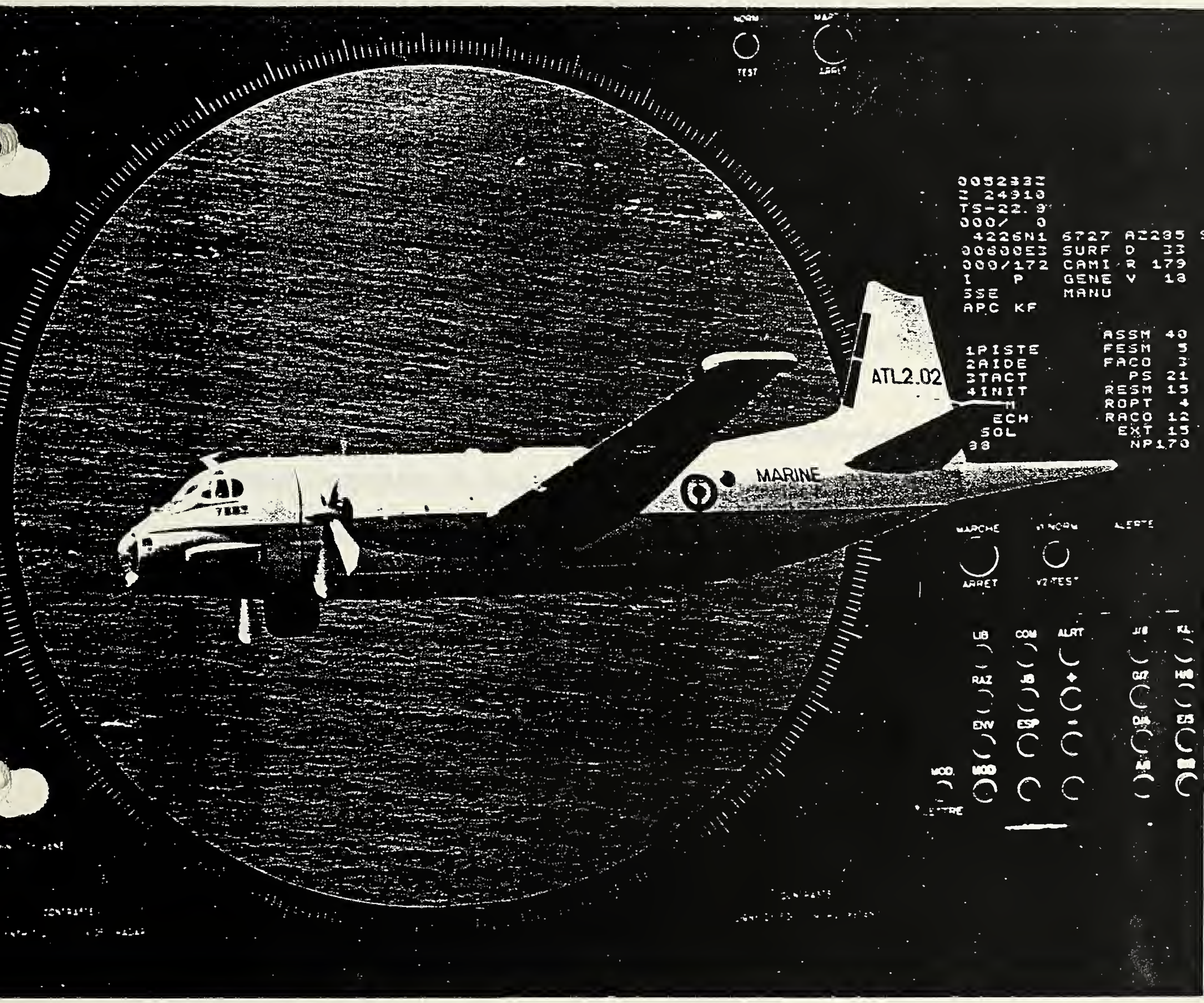
(6) Being only NATO's second weapon system project, it was the first such project to adopt the non-duplicative model of an international Steering Committee overseeing project management by an existing national governmental agency contracting to an international industrial consortium for development - a model since followed by many other projects. This could not be sâid of the organizational pattern followed in the prior NATO LWSR fighter project.

(7) The fact that each of the five national representatives making up the small tight team that was the Steering Committee were made directly responsible to the ministerial level allowed them the necessary clout to overcome the usual assortment of problems that break out at all levels within the national bureaucracies.

(8) The two major problems encountered in the program were the loss of a prototype in a crash in 1963 and the dropping out of all but two nations, France and the FRG, by 1962. Of the two, the first one, the crash, involved a minor program delay but was quickly overcome, it having been ascertained that the crash in no way was caused by any flaw in the plane

itself. The second problem, the lack of orders, proved to be a much greater damper on the program, leading to a great deal of bitterness on the part of the French, as well as a more general sourness vis-a-vis NATO programs (the dropout of Belgium, Netherlands, and the U.S. occurred around the time of the NBMR3 impasse). Though this pessimism later dissipated in 1968 with the Dutch and Italian orders, it is not difficult to comprehend the feeling in France during the six year interim where government industry and dedicated project people had done such a fine job of leadership in getting the cooperative effort underway and maintaining a schedule. The instability of program participation by the individual nations—early members quitting once the project is underway, and then late joiners coming in and wanting to share in production is a problem that has haunted a major portion of the collaborative projects since, and appears to be an almost inevitable disturbance.

(9) The fact that a country having participated in the financing of the prototype could also obtain a share of the production work even though it eventually did not buy the system, was, in the words of Robert Rhodes James "the central issue posed by the program." Though the industrial participation concommitant with a given national government's funding of prototype development was an important part of the project, this in itself could not guarantee eventual production orders from these governments. Of course it is unreasonable to expect members countries to enter into formal purchasing obligations before the project has proved itself. But then it is not always feasible to create a new consortium for production different from that which had undertaken development.



Welches ist das einzige Flugzeug, das von Anfang an für die Seeraumüberwachung entwickelt wurde?

Die ATLANTIQUE 2

Die ATL 2 ist das einzige, für diesen Zweck gleich auf dem Reißbrett entwickelte Flugzeug — im Gegensatz zu anderen Mustern, die von Verkehrsflugzeugen abgeleitet wurden.

Daher hat sie einen optimalen Doppelschalenrumpf mit einer großen Kabine für die Besatzung und die Ausrüstung. Dazu den größten Waffenschacht für die U-Boot-Jagd und die Schiffsbekämpfung.

Daher hat sie auch zwei Propellerturbinen-Triebwerke für Einsätze von 12 bis 18 Stunden Dauer mit niedrigen Betriebskosten und eine großzügig bemessene Flügelfläche für überragende Manövrierfähigkeit und Sicherheit in den Such- und Kampfphasen des Einsatzes.

Daher ferner das umfassende Waffenarsenal mit hochmodernem Radar, ESM-Anlage, Akustik-, Optik- und Magnetsensoren, die über ein Datenverarbeitungssystem und interaktive Displays miteinander verbunden sind. Sie machen die ATL 2 zum stärksten und leistungsfähigsten Seeraumüberwachungsflugzeug, das heute für die doppelte Aufgabe der U-Boot-Jagd und der Schiffsbekämpfung auf dem Markt ist.

Die ATLANTIQUE 2. Wir haben sie speziell für ihre Aufgabe entwickelt.

AVIONS MARCEL DASSAULT — BREGUET AVIATION

After summing up the lessons learned, in Standardization and the Common Production of Weapons in NATO, Robert Rhodes James went into considerable detail regarding this dilemma and his conclusions are worth quoting.If a recurrance of the Atlantic situation is to be prevented, it seems reasonable to conclude the following:

(a) Research and development should be undertaken by a consortium which, in its distribution of work, reflects the scales of individual financial contributions to the programme.

(b) Participating countries in the research-and-development programme should establish in principle a production order at a particular agreed point in the development programme.

(c) Invitations for definite production orders should be sent to all member-nations on the completion of the development stage.

(d) If a member-nation that did not participate in the development programme wished to join in at the production stage, it should, either by the payment of a lump sum or by means of increased cost per unit, compensate the participating countries for their development expenditure; it would conduct production either by building under license from the development consortium or by sub-contractorship arrangements. The country would be entitled to be represented on the Board of Directors and in the management section of the production organization.

(e) In the event of a country that participated in the development programme failing to declare a production order in principle at the agreed stage, it loses its place on the Board of Directors and in the management organization; it also forfeits its expenditure on the project up programme as though it were still participating in it.

(f) If a country that has declared a production order in principle fails to place a definite production order at the agreed time, it will pay a penalty per item that has been mutually agreed at the beginning of the project; if it fails to fulfill its definite production order completely, a higher penalty per item cancelled will be charged; all such sums to be paid to the other participating countries.

(g) Thus, by these procedures, a member-nation participating in research and development would not be committed to production purchases at all until an agreed stage, at which point a requirement in principle must be declared. If it places no production order when the time comes for definite orders, a relatively small but significant penalty would be exacted. Cancellation charges, on normal principles, would be paid if orders were reduced after the 'definite' stage. Any member-nation that had not participated in the research-and-development programme could join the production programme on the basis that it must, by one method or another, compensate the development participants for their investment.[252]

(10) Since U.S. firms had effectively been kept out of the design competition, the principal competing design with that of Breguet ended up being one

submitted by the UK's Hawker Siddeley Group. The winning design received NATO sponsorship and a name selected by NATO, 'Atlantic', but once again the project quickly took on the nature of a national project. French industry and government naturally took a lead in pushing the project through, while the government of the loosing finalist, the UK, proceeded to state its lack of need for such a system. This is remaniscent of the French and British reactions following the decision eliminating their competitors for the NATO LWSR fighter project. Though it had been expected that competition caused entrenchment of national positions could be eliminated by moving the competition back from the prototype to the design stage, this couldn't do the trick either. Once again the primary supporter through follow-on orders was the FRG who had no competing design or prototype, and was looking to such projects as a means of rebuilding its aerospace industry in such a way as to also promote re-integration into Western Europe and NATO.

(11) The Atlantic's significance vis-a-vis the NATO Basic Military Requirements (NBMR) procedures, which it in good part spawned, is treated on pages 135-6 of this chapter. Briefly put, nine nations voted to approve the technical specifications. However, four of these nations that had a voice in determining the specifications, evidentally had scant need for the aircraft since they were unwilling a year later to pay a share of the prototype development costs based on their nation's porportionate developmental share of the requirement. How could an alliance-wide collaborative mechanism meet the needs of the individual nations if it allowed those nations not seriously intending to procure a given system to have a significant voice in the tailoring of it.

(12) And as the official NATO organ summed up the cost and contract aspects of the project at the time;

> This remarkable achievement within the NATO framework should pave the way for other cooperation programmes aimed at obtaining a higher return for armaments expenditures in the Alliance, both from the economical aspect in respect of rationalizing the production programmes, and from the military angle in respect of operational standardization.[253]

h. The Achievement in Retrospect

In conjunction with the NATO LWSR fighter, the Atlantic program expanded NATO collaboration beyond Infrastructure and Logistics into Weapon Systems. While once again demonstrating the limits of allied willingness to collaborate in armaments, the Atlantic was the first step in two significant lines of development. One, it was the Atlantic that inspired NATO's initial codification of procedures for cooperative R&D and production of armaments, the NBMR procedure, in 1959. Though these procedures proved to be overly rigid in practice, once they were finally modified in 1966, NATO has since been able to enjoy the benefits of a simplified and more practical set of procedures. Secondly, the Atlantic represents the first of what has since become a considerable number of joint development projects for military equipment among member states of the Alliance. It is of secondary import that many of these projects have occurred outside of the codified, or institutionalized, procedures set up by NATO. What counts is that they have occurred and the know-how has been accumulated, even though it was only on an ad hoc, and not an alliance-wide, centrally directed basis.

To whatever extent the Atlantic project set a pattern for the future, it represented a practical method, devised by trial, under a given set of circumstances, that was one of the most successful operations of its kind. It may not prove to be an exact blueprint to follow in other, less similar cases, but if nothing else, as a Mr. Stone of NATOs International Staff aptly commented, it became "a valuable precedent and addition to the growing history of countries finding it possible to work together in a common defense production effort."[254]

i. Sequel - France's Atlantic Nouvelle Generation and Germany's Kampfwertsteigerung Program: A Statement on the Vulnerability of Such Dual Consortia over the Long Run

The follow-on project to the Atlantic, the Atlantic Nouvelle Generation, along with the German Modernization program offer some additional insights into the nature of multinational collaboration, and introduces several of the eight Modes around which Part II of this paper is organized.

In spite of their having acquired Atlantics, the French, Dutch, German and Italian navies continued to operate a fair number of the aircraft the Atlantic was originally meant to replace, the Lockheed P-2 Neptune and the Grumman S-2 Trackers. As such it was primarily with the aim, once again, of replacing Neptunes that discussions first began in the early 1970s about how SECBAT participating firms and countries might continue their association by developing an improved version of the Atlantic. For a number of reasons these talks failed to produce agreement.[255]

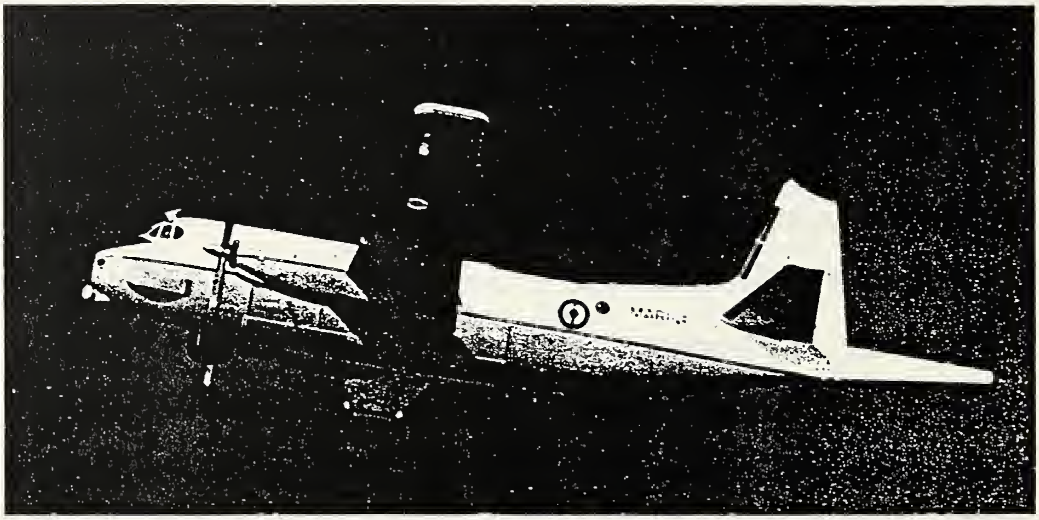
(1) France's Atlantic Nouvelle Generation (ANG)

By the end of 1974 France had decided to proceed on her own with a project to replace the Neptunes from about 1984, and then subsequently the early-model Atlantics. France intends to procure 42 units in all of the new aircraft.

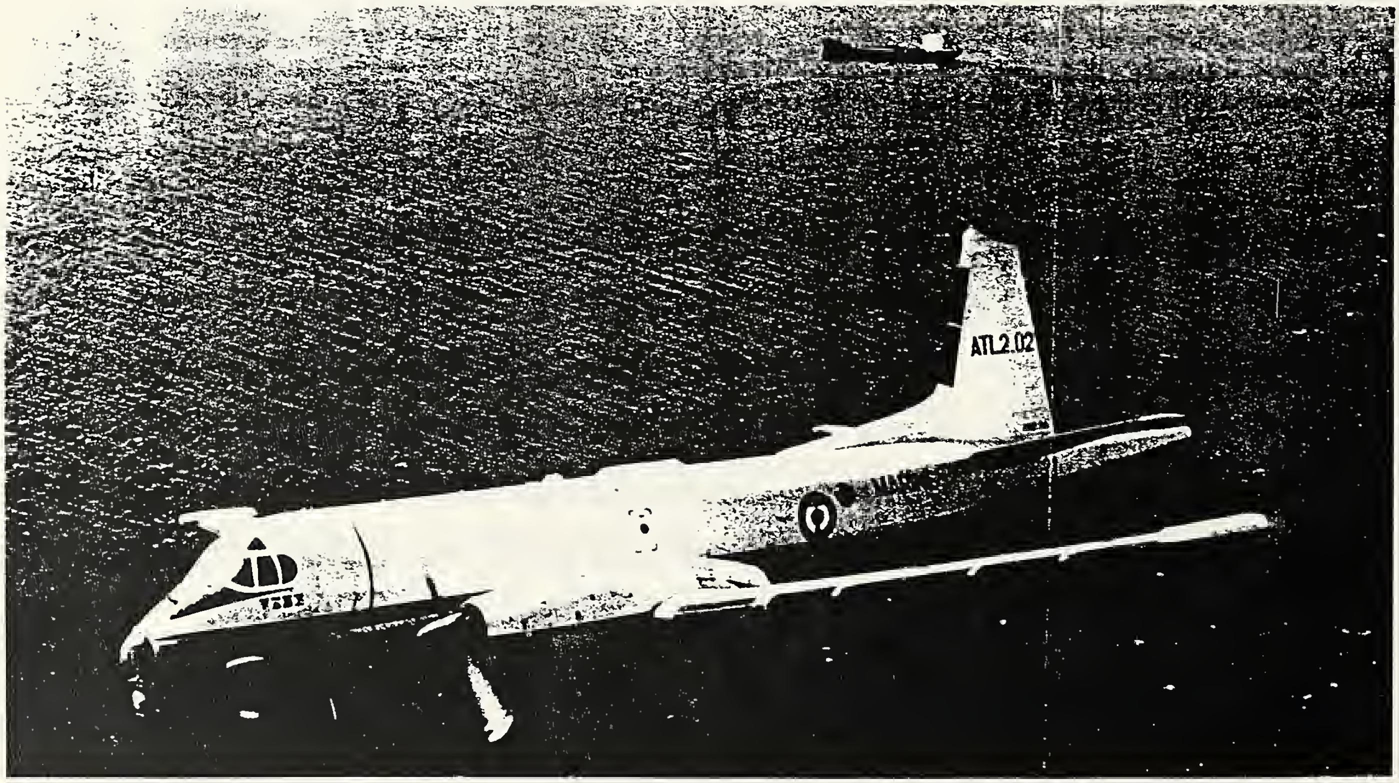
The first proposal to the French government by Dassault-Breguet for an Atlantic Mk2 was dropped in 1975, being considered too ambitious and costly.

• INDUSTRIALISATION. Le Ministre de la Défense a notifié à la société AMD BA la décision de lancer la phase d'industrialisation et de série de l'Atlantic Nouvelle Génération au profit de la Marine Nationale.

L'ANG, basé sur une cellule et un système de propulsion très proches de ceux du Breguet 1150 Atlantic comporte un système d'armes totalement nouveau. Deux prototypes dont les premiers vols ont eu lieu le 8 mai 1981 et le 26 mars 1982, poursuivent actuellement leurs essais en vol. ▶



Le deuxième prototype de l'Atlantic Nouvelle Génération a fait son premier vol le 26 mars 1982 (AMD BA).



En vol au-dessus de la Méditerranée, le second prototype de l'Atlantic 2e génération (Doc. AMD BA).

The subsequent Mk3 proposal went too far in the other direction and was likewise dropped.

What finally emerged was the Atlantic MK4 (now known as the Atlantic Nouvelle Generation—ANG), full-scale development of which for the French Navy was authorized by the Government in the Spring of 1977.[256]

The following year the French and Dutch were again actively exploring the possibility of a joint effort, but this time it involved a series of inter-related aircraft deals along the lines of Mode #8 of North Atlantic collaborative business relationships, treated in Chapter 13. The Dutch, seeking to strengthen their links with the French aircraft industry, were offering to order 13 ANG's and participate industrially, if the French would order 18 Fokker F-27's for training and patrol missions, and join a development and manufacturing partnership for Fokker's planned F-29 program.[257]

It was over the F-29, a key part of the package that the two governments reached an impasse in late November, 1978, and the deal collapsed. The French claimed that the F-29 120-seat commercial transport project was not sufficiently defined and that they couldn't promise carte blanche support. The Dutch countered that the French offer, as well, was vague.[258]

The following month the Dutch selected the ANG's competitor, the Lockheed P-3C Orion. The 11 Orion's were purchased through an FMS contract negotiated with the U.S. Navy for $300 million - which was reportedly less than the cost of 13

ANG's. The P-3C's, to be assembled by Lockheed at its Burbank plant will be delivered between 1981 and 1985.

Lockheed negotiated a separate off-set agreement with the Dutch government worth at least $60 million (20% of the purchase). Though Lockheed had previously offered to let Fokker assemble and test the P-3C (Mode #1, treated in Chapter 6), in a presentation to the Dutch permanent parliamentary commission for defense, the actual agreement involved offset purchases external to the project (Mode #6, treated in Chapter 11). The emphasis for this offset was placed on high technology products.[259]

Following the Dutch selection of the P-3C there was serious discussion in France of eliminating them from any future airframe work. The Germans and Italians still have there shares, at this time.

Throughout these efforts Italy has remained uncommitted although it will have to replace its Grumman S-2 trackers in the mid-1980's.

The ANG is designed to meet an expanded spectrum of role requirements, while being optimized for countering the increasingly demanding submarine threat into the next century. The mission for the ANG, being more complex than that of the previous Atlantic, involves almost equal weight being given to ASW and surface surveillance/anti-surface warfare, as basic roles. Secondary capabilities include minelaying, logistic support, search and rescue, fishery protection and patrolling of the 200 nmi. economic zone.[260]

Use of essentially the same airframe/powerplant combination as the previous Atlantic is fundamental to the ANG program. For the airframe there will be a number of improvements in structural design and fabrication, while the Rolls Royce Mk21 Tyne powerplant will remain the same. Where the ANG is completely new is its mission avionics, almost all to be supplied by the much more highly evolved French aerospace industry, this time around.[261]

(2) The FRG's Kampfwertsteigerung (KWS) Program

As we have just seen with the ANG with an aircraft weapon system, the fuselage, engines and basic equipment have a considerably longer life at full service efficiency than the mission avionics and weapons complement. While a weapon system has a typical service life of 20 years, the electronics and weapons generations follow each other in only about five years.[262]

Initially the German Navy opted to replace its Atlantics outright. The Lockheed S-3A Viking ASW aircraft seemed to be the most favored solution up to 1977, even though it was a costly one. But when German industry came up with a solution for reducing the severe corrosion problems that the Atlantic had been suffering from,[263] the German Navy decided that it would be better to postpone replacement until 1990, through a modernization program, the Kampfwertsteigerung (KWS) program. The FRG has therefore remained uncommitted as far as a replacement aircraft is concerned.

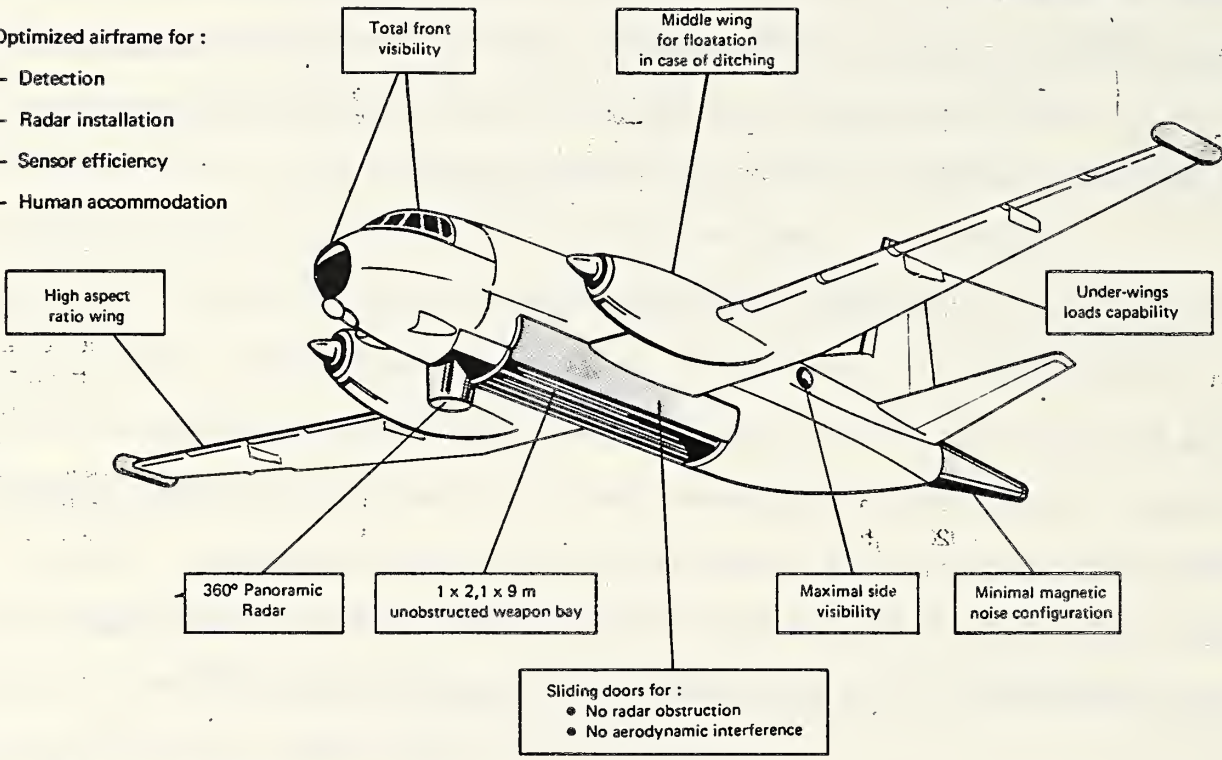
As such, after the Atlantics had been in operation for more than a decade and a replacement of obsolescent electronic sensors by modern high-performance

MAIN FEATURES

Atlantic ANG

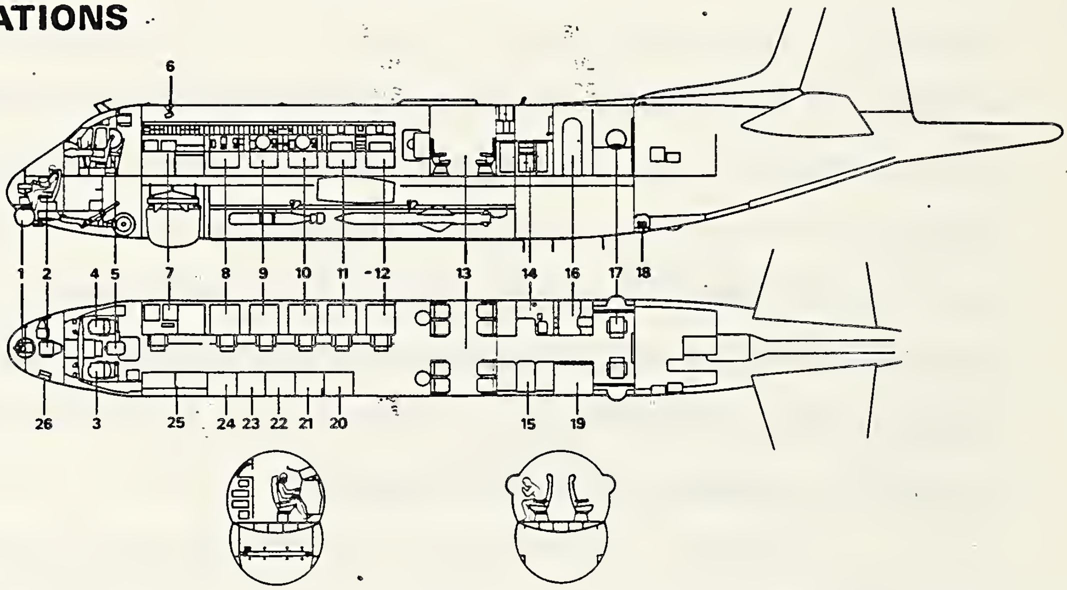
Optimized airframe for :

- Detection
- Radar installation
- Sensor efficiency
- Human accommodation



ACCOMMODATIONS

1 : FLIR
2 : Front watcher
3 : First pilot
4 : Second pilot
5 : Flight engineer
6 : Sextant
7 : Radio-navigation station
8 : SM-ECM-MAD station
9 : Radar-IFF station
10 : Tactical coordinator station
11 : Sonobuoy operator 1
12 : Sonobuoy operator 2
13 : Rest compartment
14 : Galley
15 : Crew room (table and seats)
16 : Lavatories
17 : Rear watchers
18 : Camera
19 : Wardrobe
20 : Radio equipment
21 : Radar-IFF equipment
22 : Sonobuoys receiver
23 : Computer
24 : Navigation equipment
25 : Electrical circuits
26 : Side-looking camera



Main Design features of the ANG

Source: Dornier Post

equipment became necessary. Since a joint decision of all four Atlantic users could not be reached the FRG decided to implement an equipment modernization program on a national basis.[264]

Following Dornier's performance of a definition study, it was selected over the U.S. firm E-Systems, to be the prime contractor responsible for integration of all the equipment into the weapon system. Dornier signed a fixed-price contract for DM 170 million in mid-1978. As prime contractor, Dornier subcontracted to a predominantly U.S. team including: E-system for the inertial navigation platform combined with an Omega receiver; Texas Instruments for its AN/APS-116 radar (also used on the S-3A Viking); Loral for the electronic support measuring (ESM) system; Bell & Howell GmbH for a modernized tapê recorder system; Emerson for the sonar; and to ESG-FEG for logistics support. Dornier itself, supplied the new buoy release system.

As for the Atlantic's replacement, studies are under way covering the future scenario and threat situation. Alternative concepts are being evaluated on a comparative basis. In this process both advanced conventional answers such as the classic maritime patrol aircraft, designated the MPA 90, and new-type concepts are being examined. One of these new concepts involves the AWS role being fulfilled from ship-based helicopters.

Dornier has again been chosen by the Federal Ministry of Defense to perform these studies and will therefore be deeply involved, alongside the Atlantic modernization program, with future means of providing surveillance of maritime areas.[265]

Well, so much for increased intra-European collaboration—for which the Atlantic was a significant step forward—locking out future U.S. industry. Though there will continue to be increased ad hoc collaboration, let there be no mistake, this does not mean increased integration. As we've seen with the Dutch and the Germans, the smaller countries and sometimes the FRG, are still open to counter offers from the U.S.

In conclusion, though the Atlantic represents the first successful project within Mode #3 of industrial collaboration, and in that sense is of major import, the consortium has since melted away. France developed the follow-on system on its own, the FRG opted for a unilateral modernization program (with U.S. firms supplying almost all of the equipment) for its existing Atlantics, Italy has remained uncommitted, and the Dutch opted for procuring a U.S. system accompanied by a bi-lateral external offset a la Mode #6. Of course it remains to be seen whether France will be able to attract any other nations to join the project. Additionally, the attempted French-Dutch ANG deal serves as yet another reminder of the difficulty, though not impossibility, of tying several projects together into a package that would allow for a more rational quid pro quo.

3. NATO BASIC MILITARY REQUIREMENT (NBMR) 3

a. The NBMR procedures

The procedure worked out for the Atlantic program between 1957 and 1959, served as a basis for a codified set of official NATO procedures for collaboration in defense acquisition drawn up in 1959 and contained in NATO Document C-M(59)82.

The failure of the NATO allies to attain any significant level of collaboration in the development of armaments, further fed by the hopes raised by the post-Sputnik initiatives for producing several advanced U.S. systems in Europe on a multi-national basis (i.e. Hawk and Sidewinder), became the cause in 1958 of increasingly sharp criticism within the Organization and among the member states.

> It was as a result of pressures from several quarters that the Council, in August 1959, agreed to establish procedures for the formulation and promulgation of NATO Basic Military Requirements (NBMRs). This decision stemmed from the widespread conviction in NATO that the fundamental weakness was the absence of precise and fully known NATO military requirements among the member-countries. It was believed that it would be a distinct step forward if every member-country were fully aware of the time-scale and nature of the Alliance's military needs, and could accordingly plan its own requirements within the overall NATO structure.
>
> Under the document approved by the Council in November 1959, the term Basic Military Requirement was defined 'as an indication in general terms of the kind and type of equipment required, and also of the quantities needed and the date when it is desirable that the equipment should be in service'. The document endeavored to set out a formal process from the formulation of a military requirement to the production of the finished item.266

The process was to start at one of several places in the Alliance's military network with a statement by either a national or an international spokesman to the effect that some unit had a "need" for a weapon that would perform a certain task. General statements of requirements were then funneled into the NATO Standing Group, which edited and circulated them to all member nations and international headquarters. The individual nations responded to the Standing Group, stating their opinions as to the need for the type of equipment in question. The Standing Group then attempted to arrive at a common view concerning the desirability and general nature of the weapon. If such a consensus was obtained, the result was passed to the Armaments Committee in a form known as a NATO Basic Military Requirement (NBMR).[267]

The appearance of an NBMR, however, meant only that the military authorities had agreed on NATO's need for equipment to do a certain job; the NBMR did not represent a consensus on the specific characteristics of the weapon needed to perform the task (e.g. range, speed, type of propulsion).[268]

Responsibility then passed from the military to the Armaments Committee at the top of the coordinated production pyramid. Composed of one representative from each allied nation, the Armaments Committee, like all NATO bodies, operated on the principle of unanimity.[269]

Upon receiving an NBMR, the committee then polled the member nations to find out how many were interested in attempting a cooperative program. If several had responded favorably, the Armaments Committee convoked an Ad Hoc Mixed Working Group (AHMWG) - "mixed" denoting membership of both civilian and

military experts -composed of several representatives appointed by each interested nation. The Armaments Committee and the AHMWG's were assisted by the Production, Logistics, and Infrastructure Division of the International Staff/Secretariat for administrative and clerical tasks. Although members of the International Staff often try to "synthesize" divergent national positions, they act only as servants to the assembled national representatives, not as directors. They do not stress their own opinions regarding any given type of equipment.[270]

The first task of the AHMWG was to translate the very generalized military requirement into more precise "operational characteristics." These, in turn, were then to be translated into the "technical specifications," which stipulated the general appearance and the performance to be demanded of the product (e.g. range, accuracy to be demanded of the guidance system, yield of the warhead, gross weight) etc.[271]

If the AHMWG members could reach agreement on specifications, nations were requested to bring forward any development project or existing hardware which could possibly satisfy the requirement. If there was none, the technical specifications were circulated among a group of manufacturers nominated by countries that wished to participate.[272]

The AHMWG allowed a reasonable time for the preparation of designs before it reviewed and evaluated the competing manufacturers' proposals. A winner was then to be selected by unanimous approval of the AHMWG, and the decision ratified by the Armaments Committee.[273]

After a design had been chosen, the AHMWG was to arrange for the financing of the construction of one or more prototypes. Since NATO as an entity has no money for research or development, it was the individual nations that had to be persuaded that it was worth their while to contribute to the prototype building program. The need for cash support of the program was expected to winnow out the least-interested nations. Participation and funding arrangements are 'sui generis' and therefore had to be negotiated separately for every project.[274]

If the necessary funds are raised, and if the prototype meets performance standards, the AHMWG could begin to phase out.[275]

Production, sales, and negotiations for subcontracting would be handled by nations and manufacturers primarily on an individual commercial basis. The company that designed and/or built the prototype became the central agent in the formation of a production consortium.[276]

An impressive procedure. Logical, flexible, however....

b. NBMR3

In 1959, NATO began exploring the drafting of NATO Basic Military Requirement #3 (NBMR 3), a V/STOL light strike reconnaissance aircraft to follow the NATO LWSR, and one for which NATO nations had expressed a strong need. It was envisaged that NATO nations would need 1,000 such aircraft. NBMR 3 was finally drawn up in June, 1961, and January, 1962 was agreed to as the closing date for the design competition.

By this time NATO authorities had supposedly learned their lesson, from the LWSR episode in particular, a project which had found nations irrevocably committed to their own competing prototypes. Once a nation builds a prototype for a NATO competition, its resources and prestige were at stake. This obligated nations to see the equipment through to production. Therefore, the idea behind the NBMR procedure was to reach agreement on a single design, as with the Atlantic, and thereby reduce the chance of a deadlock forming yet again among the governments, as occurred with the NATO LWSR fighter. And as for industry, firms reasoned that, as members of such a group they stood a better chance of becoming subcontractors or licensees, than if they played a lone hand. In the case of NBMR 3 most of the multinational consortia formed consisted of a team of two firms from different nations, but one included seven firms from some six nations.[277] The work sharing arrangements, much like those of the Atlantic, were that the firm, or team of firms, whose design was selected would act as the prime contractor, with the other firm or firms assuming subcontractor roles for development, to be followed by production participation as subcontractors or licensees. In addition, the work would be distributed among the firms on the basis of national orders and facilities available.[278]

It was expected the design could be selected before manufacturing nations had made any commitment of resources and prestige through prototype construction. Submissions were to be made to an ad hoc NATO selection committee for the nomination of the winning companies to be followed by the allocation of contracts by the national governments.

But then agreement on design presupposed agreement on precise, definitive technical specifications for the needed equipment. Herein lied a major stumbling block. These final specifications usually discriminate among the leading contenders in a way which points to the design to be selected, prejudicing the contest. For these, as well as for such other reasons, as geographic or doctrinal differences, some national delegates to the NATO ad hoc mixed working group (AHMWG) would press for one set of specifications while others would hold out for a rival set. For NBMR 3 a set of specifications favoring a particular method of providing vertical and forward thrust would in effect be favoring one of the three principal European national contenders, each having investigated a different principal for providing lift.[279] Therefore the specifications issued to industry in 1961 by NATO had to hedge on these details, which only postponed the confrontation.

This problem was never overcome for NBMR 3, nor, at least as of 1966 when they were replaced, had it been overcome for any of the other military requirements originating within NBMR procedures. By January 1962, the NBMR procedure for the V/STOL light strike fighter (NBMR 3) had reached an impasse. With a dozen designs submitted by firms in France, the FRG, the UK, the U.S., Italy, the Netherlands and Belgium, adjudication had become impossible due to disputes between the various national delegations. Though the selection of a common design prior to development was intended to prevent the governments and industries from becoming entrenched along national lines, the contrary had occurred and they quickly dug in. So in this respect, the NATO LWSR fighter experience was repeated. Both the French and British Governments let it be known that no matter who won, they would equip their Air Forces with their own Mirage III-

V's and Hawker P-1127's[280] respectively, while the FRG hinted that they, too, were considering pushing their independent development of the Focke-Wolfe 1262.[281] As such, a project that had been meant to standardize equipment and demonstrate allied solidarity had in the end engendered a plethora of competing national prototypes and caused considerable bad blood.

c. NBMR4

Another such project was NBMR4. NBMR4 was for multi-purpose V/STOL transport aircraft, for which the proposals were due for submission by August 31, 1962. The range of this aircraft was to be of the order of 500 nautical miles, with a take-off distance between 500 and 900 feet, and a cruise speed of greater than 200 knots. It was required to support the short airfield operational combat aircraft and the VTOL close air support aircraft (NBMR3) which were envisaged by NATO for operation in the mid-70s. From the 27 initial studies of the NBMR4 competition, the field was reduced to three contenders.[282]

The British Aircraft Corporation BAC 208, in partnership with Aerfer of Italy, used Bristol-Siddeley 53 Variable thrust engines, and a Ling-Temco-Vought design based on a tilt-wing proposal adopted by a U.S. Tri-Service group on VTOL transport. The Hawker-Siddeley entry was based on the Armstrong-Whitworth 681, also using BS 53 engines, and a de Havilland (Canada) Mark 2 version of the Caribou turbo-prop aircraft. The third contender was the Breguet 943 based on a blown wing version of its 941 STOL transport.

Here, once again common selection of one contender proved to be impossible.[283]

d. Conclusions

In projecting the NBMR 3 experience as one that typified the whole NBMR procedure, Vandevanter pointed out the following basic truth.

> The tendency of country delegates to reject specifications inimical to their nations' interests is widely recognized as the prime stumbling block in the system. Even where these military or technical representatives themselves would like to accept compromise—which many privately admit is often the case—they are prisoners of the system that restricts their powers to negotiate. Even if they were not under specific instructions from governmental authorities, they would find it difficult to ignore the sentiments of their national press and industry284. Thus, each representative must strive for adoption of criteria that will give his country's design the inside track. Also, a manufacturer has little to lose by attempting to influence his national representative to hold out for NATO specifications that are slanted in his favor; he can be sure that his own government will buy from him even if no international arrange-ments are worked out. Therefore, his only incentive to compromise or strike a bargain with a foreign manufacturer would be by the expectation of still greater sales through an abnormally large share of the NATO market. This could occur only where such a manufacturer has developed a unique piece of equipment. Otherwise, he is likely to prefer the whole of his national market to a portion of the NATO market.285
>
> So far, only one article has completed this tortuous procedural path: the Atlantic Maritime Patrol aircraft. Its experience illustrates many problems inherent in the present system. In 1957, when the Armaments Committee convened a Group of Experts to consider the requirement for such an aircraft that had been passed up by the military estabishment, thirteen nations were represented. Several of these had dropped out a year later, when nine country representatives voted unanimously to approve the technical specifications. When it came to financing construction of the prototype, only five nations remained enthusiastic enough to contribute funds. (While five out of nine represents an impressive number of participants, for many countries have scant need for this type of aircraft, one wonders why the four countries with little interest should have had a voice in determining the specifications.) At the end of 1963, after the prototype had been constructed and tested, only two countries had placed firm production orders, and these totaled only forty aircraft.286
>
> Most knowledgeable observers consider the Atlantic an exception rather than a pioneer; they think that it squeezed through because of a combination of circumstances unlikely to recur.287 When the project was introduced in NATO, only a few manufacturers were thinking

> about slow, long-range, propeller-driven aircraft, and most of those who were interested and had the necessary produciton capacity were American. At that time, however, the U.S. government discouraged American companies from competing with the struggling European industry. The policy was changed a few days before deadline for submitting design bids, but by then most American manufacturers were unable to put together adequate proposals. With the main competitors thus eliminated, the selection process was relatively simple.288

...Certainly, a system lacks realism if it does not require that any nation demanding a voice in the specifications of the equipment also help finance its development. Defenders of the system we have described...are opposed to making either a pledge to buy the final product or participation in prototype financing a prerequisite for voting on specifications. They argue that NATO always operates on a voluntary basis; that every nation should have a voice in determining the kind of equipment to be developed for common procurement; and that no nation should be forced to commit itself in advance to buying a weapon that has not yet been designed or tested and may turn out to be unsatisfactory.289

NATO rules do stipulate that only those nations which contribute funds for prototype construction may continue to be members of the directing panel. But this requirement does not cut to the core of the problem of achieving a consensus. The impasse usually occurs long before, either in military channels or, more frequently, when the national representatives in the AHMWG's meet to draft the technical specifications - the "moment of truth," as one official puts it, which often lasts for years. Whether it be tanks, guns, aircraft, or ships, each manufacturing country will have its likes and dislikes about many characteristics of the proposed equipment. In the case of a radar set, it may be that a nation is already committed to a program for a certain bomber and will therefore require the new radar equipment to have specific qualities compatible with the projected bomber. Or, one nation may have discovered a way to achieve greatly superior definition and discrimination on a radar set, though at some sacrifice in range, while another country has equipment that excels in range. Occasionally, a competitor who needs only a little more time to perfect an article or a technique will try to delay proceedings. Some nations need replacement articles urgently and want to take what is more readily available, while others with adequate equipment, would prefer to proceed slowly and wait for a technological breakthrough.290

In short, the NATO institutional (NBMR) procedure has deficiencies for which no remedy is apparent. Its cumbersome quality stems from its dependence upon committee agreement at several controversial stages: the formulation of military characteristics, the statement of technical specifications, selection of the design, and financing

of the prototype. The unanimity required at each step is very difficult to achieve when more than one country is competing for the contract.291

Contrary to Vandevanter, Robert Rhodes James' writing in 1967, did not place the onus of failure on the procedures themselves, but instead the manner in which the member nations used them in practice.

> It should be emphasized that the system approved by the Council was deliberately kept flexible; indeed, it was a major feature of the suggested arrangements. But, as so often happens, the system was regarded as being a fixed one, with defined stages, to which all projects should conform. What was intended to be a general guide became a rigid system, thus seriously weakening the entire concept.
>
> What subsequently transpired is a classic example of how the best-devised systems of organization, consultation and preparation collapse if there is an absence of will to make them work effectively. Up to the end of 1965, not one NBMR had directly resulted in a co-operative venture to produce equipment to meet the agreed military requirement. One is confronted by the startling spectacle of a large organization slaving away at the preparation of mutually-agreed military requirements and achieving so little.
>
> A fair example to cite is that of the projected V/STOL strike fighter aircraft, required in service by 1965-66. This particular NBMR has been criticized as characteristic of an absence of realism on the part of the NATO military authorities, whereas the real obstacle to the project was the fact that no member was prepared to divert sufficient national resources to concentrate on the project. In these circumstances, the only practical solution was to co-operate on research and development. In the event, the NATO effort was dispersed over several designs, sharp differences arising between individual countries on the best manner of achieving the desired result. This episode seems to be the 'locus classicus' for providing common funding arrangements in NATO for initiating feasibility studies and even the building of prototypes, and underlines again the critical importance of an agreed strategy and strong political will.292

Valid as R. R. James comments are, he still doesn't adequately address the problem. The Alliance needed a set of procedures that take the realities of

valid conflicting interests, schedules and so forth into account. The need was to avoid the situation of forcing the nations to reach a concensus for a system within too wide a grouping. What was needed was an even more flexible system which facilitated like-minded nations getting together in smaller groupings where unanimity could be attained short of herculean displays of political will. This is what was accomplished in 1966. The challenge then, has been one of minimizing their number through an enlargement of participants in each. It has not been one of eliminating these ad hoc groupings centering on somewhat duplicative systems (which also represent valid differences in individual national requirements), but rather one of ensuring interoperability between them.

To cite but one recent example of the tendency to forget, or assume away, the example of NBMR procedures and the lessons it taught the Alliance, and its continual relevance at the close of the 1970's, there is a recent document written for NATO by a Julian Critchley a conservative British MP and former Chairman of the Western European Union Assembly's defense and armaments committee from 1974-1977. Critchley said that NATO's incessant RSI problems could be solved within the framework of the EEC. As the two main causes for the slow and piecemeal nature of progress to date he cites:

—the rights of independent states to set their own defense policies;[293]
—competition and vested interests of rival arms manufacturers in a free market ecomony.

To bring about a Common Market defense industry and promote the "two-way street", he recommended the setting up of a European armaments procurement agency, as a section of the EEC Commission or an agency responsible to it. "The agency would draw up specifications for a given period and it would be the body responsible for negotiating on a cooperation and a division of labor with the U.S. and Canada in all that concerned arms procurement."[294]

This author is of the opinion that such schemes, and the many similar ones, proposing the establishment of a supranational institution and procedures to rationalize the Alliance represent a confusion as to the planet and century we are all working with, and contribute little to the NATO RSI effort.

e. Lessons Learned

(1) Reinforcing a lesson learned from the NATO Atlantic experience, but ignored in the establishing of the NATO Basic Military Requirement (NBMR) procedures, was the fact that moving international competition back in the acquisition cycle from the prototype stage to the design stage couldn't circumvent the entrenchment of national governments behind their national industries.

(2) The impasse, in fact, usually occurred at an earlier stage than design, at the point when the national delegates were attempting to obtain concensus over the technical specifications to which the design was to be tailored. As Vandevanter stated in 1964, "The tendency of country delegates to reject specifications inimical to their nation's interests

is widely recognized as the prime stumbling block in the system." As such the required unanimity for decision making among the alliance-wide grouping of sovereign nations participating in this process, was never attained. Once again the Alliance learned that there was no special formula of an organizational or procedural nature that could force the allies to cooperate when they perceived it as contrary to their individual self-interests.

(3) Therefore, if NATO procedures for cooperation in research, development, and production, were ever to provide any tangible results they would have to be structured so as to work with, not against these basic truths. NATO developed and approved such a set of simplified and flexible procedures contained in NATO Document C-M(66)33, 1966. These were again substantially revised in the late 1970's and replaced with NATO's Periodic Armaments Planning System (PAPS). It is these we utilize today. These procedures fell short of any grandiose scheme to force the allies to rationalize, but are realistic in what they aim to achieve—serving as a conduit for information exchange and a forum allowing any 2 or more nations to work within the NATO system without being forced to go outside of it in order to circumvent alliance-wide concensus. They differ from the prior procedures contained in NATO Document C-M(59)82, in that they are more flexible in allowing interested nations to arrive at a reduced grouping of nations for a given project within which it was possible to reach a unanimous decision. The previous procedures had, in practice been overly ambitious, in that they forced allied nations through an alliance-wide funnel from the beginning which did not allow for a

workable concensus to be obtained for any given system. Consequently, the plumbing backed-up.

(4) Where multinational competitive selection was to occur succesfully in the future, a much more restrictive set of criteria would have to be met. The specific projects complying with one or more of these criteria are treated in detail in Chapter 3 and part II of this paper. These met either the criterion of:

(a) competing consortia, each of which included on the same proportional basis firms from all key participating countries, and a guaranteed share of work closely in line with the principals of 'juste retour' for all, or at least the key funding nations. This was the case with both the three competing consortia for the NADGE contract, the competing consortia for the 1978 NATO Satcom III ground segment contract (both covered in Chapter 3), and the Franco-German trainer/ground support fighter design competition of 1970 which resulted in the Alphajet (covered in Chapter 8);

(b) the competition was over smaller sophisticated equipment contracts or just brick and mortar projects within the International Competitive Bidding procedures of the NATO Infrastructure Program or the NATO Maintenance and Supply Agency (NAMSA); or

(c) there were simply no competing systems from those nations within the ranks of the selecting consortium of governments. This was either

because; none existed within the reduced grouping as with the F-16, or one nation within the Alliance (usually the U.S.) was in a monopoly position and therefore the selection could occur within it alone, as when the Boeing E-3A was selected over the Grumman E-2C for the NATO Airborne Early Warning and Control system (see Chapter 12), or when the Boeing PGH-2 hydrofoil, was selected over the Grumman PGH-1 (see Chapter 10) or the purely U.S. competition for the NATO Satcom II & III space segments (see Chapter 3).

D. NORTH AMERICAN AID

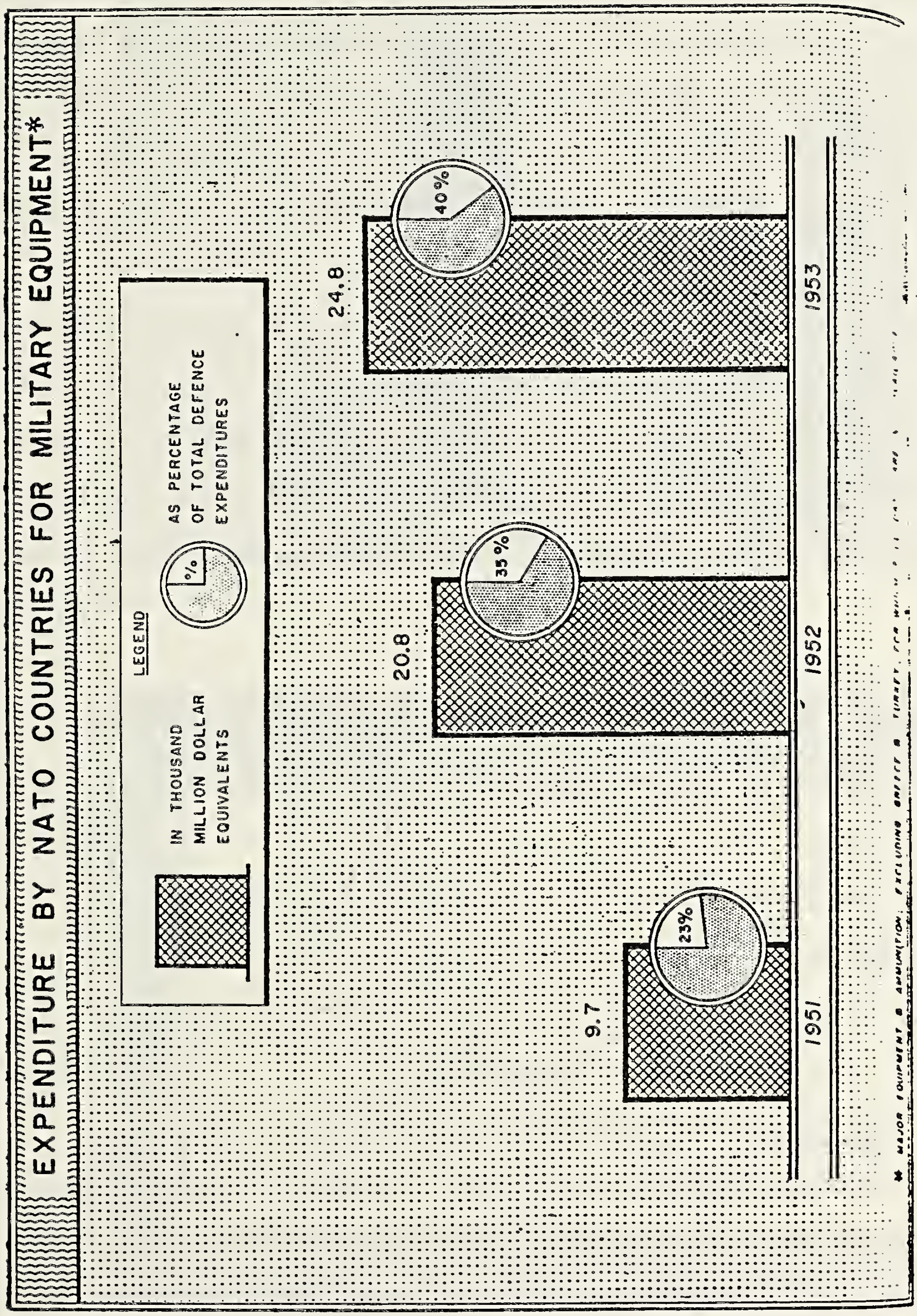
During the 1950's the contributions toward making NATO a military reality could be divided roughly as follows: in terms of manpower placed under NATO command, and in land and other facilities made available for joint military use, the European members were contributing by far the greater share; whereas the two North American members contributed the greater part of the weapons, ammunition, and other equipment necessary for the buld-up of NATO forces.[295]

As of 1958, according to one estimate, over half the heavy equipment in use by the Europeans alone, had come from the United States and Canada. In addition to American aid, off-shore procurement, was used to finance the building, in European facilities of equipment to be distributed to the Allies.[296] Later outgrowths of this also financed in part the first joint development and first joint production projects.

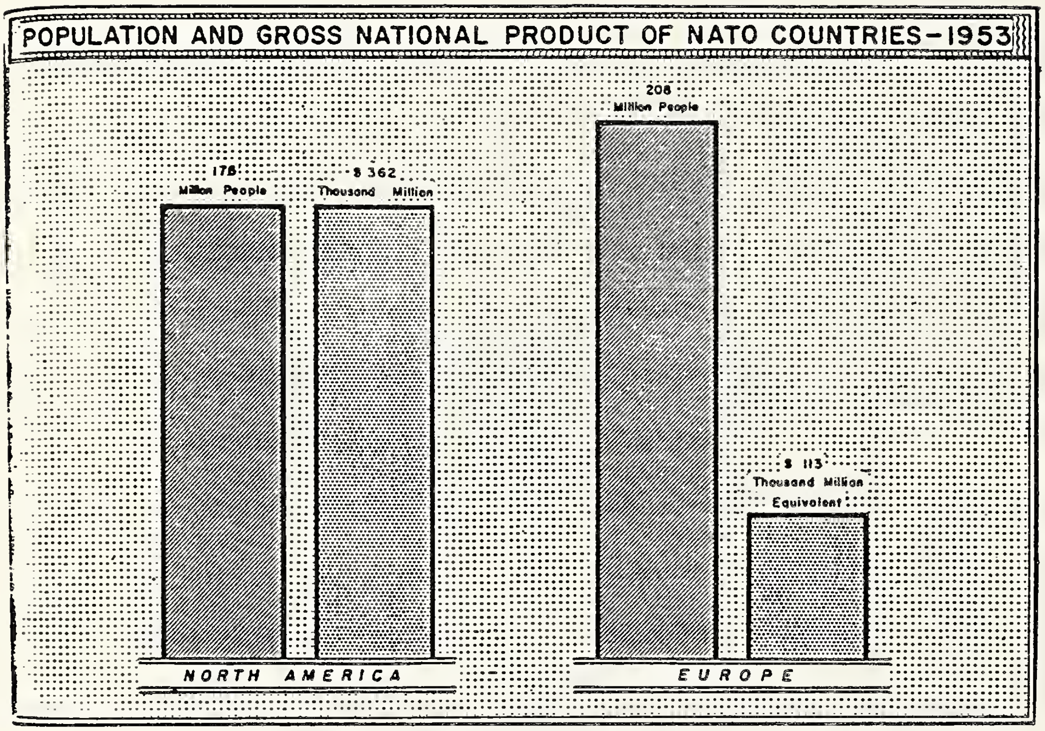
The total money value of the United States and Canadian aid programs for European NATO countries, in amounts voted from 1948 to April 1954, was on the order $30 billion - more than half of this being for military equipment.[297]

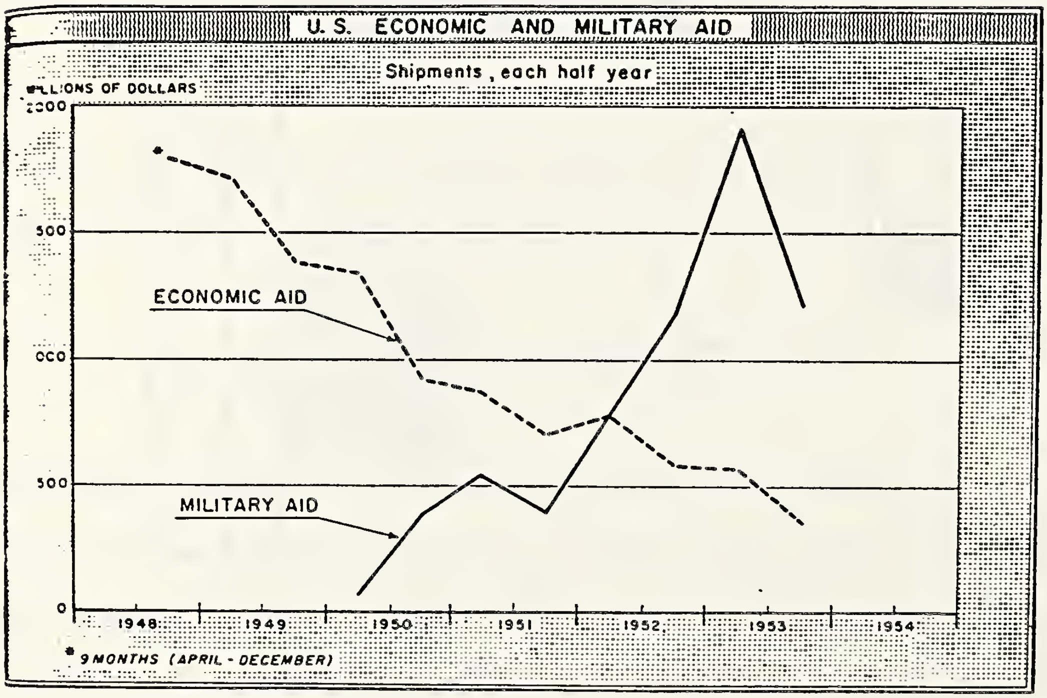
1. CANADIAN AID

The Canadian mutual aid programme began in 1950, in conjunction with the decision of the Canadian Government to re-equip its land forces with American-type equipment. The British-type equipment with which their forces had previously been equipped, or which was being kept in reserve stock, was made available to NATO.[298]



Source: Ismay





Source: Ismay

From the beginning, in contrast to U.S. aid, Canadian aid has been made available on the basis of multilateral offering to NATO countries. It was transferred to individual European recipients in accordance with Canadian acceptance of allocations recommended either by the the Standing Group or by the NATO Secretariat. In this way, the early phases of the Canadian aid program provided equipment and ammunition to European ground forces, every European member nation being a beneficiary.[299]

The later phases of the program include more than 500 of the U.S. designed F-86 Sabre jet aircraft, spares, radio sets, early warning radar sets, minesweepers and a wide range of ammunition and explosives. Canada has since manufactured much of her equipment to American design, ensuring a major degree of standardization. The value of Canadian end-item aid as of 1955 stood at $850 million.[290]

In addition to end-item aid, Canada had also conducted training programs for NATO European pilots and other aircrew at a total cost of over $200 million as of March, 1954.[301]

2. AMERICAN AID

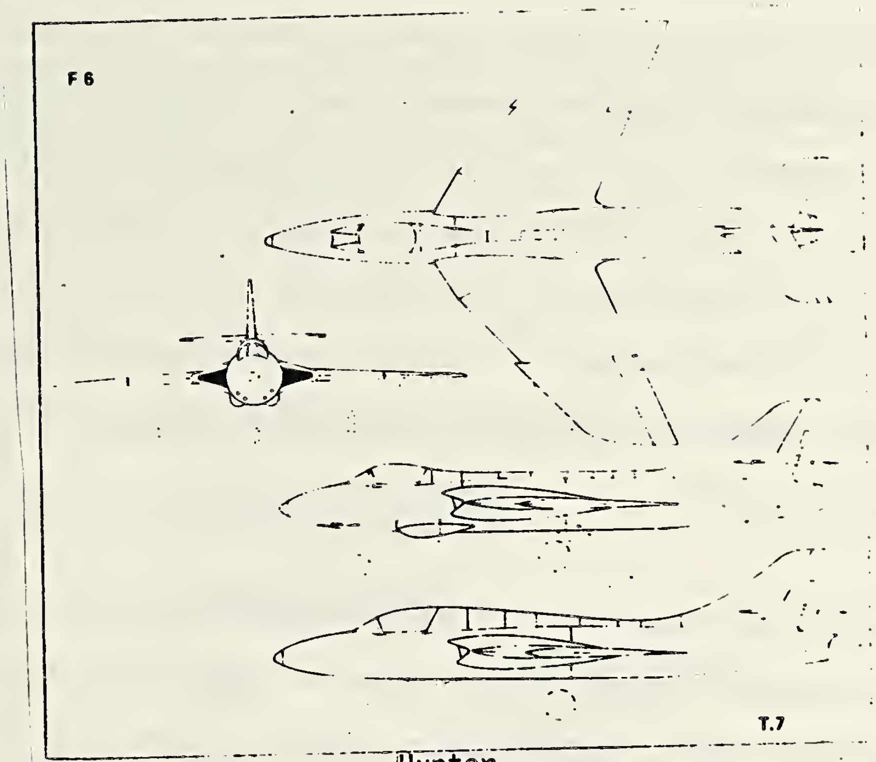
In October 1951, the United States' Mutual Security Act was approved. Unlike Canadian military aid, United States aid to Europe, whether economic, or military was furnished on the basis of bilateral agreements negotiated between

the United States and the individual recipient countries. The level and the nature of the military aid given to NATO member states was decided on by the U.S., even though it was based on the military force goals agreed upon in the course of NATO's Annual Review, the recommendations of the NATO military authorities and the ability of the recipient country to utilize the aid effectively.[302]

By the beginning of April 1954, the value of military equipment shipped or planned by the United States for delivery to its European partners had reached about $15,000,000,000.[303]

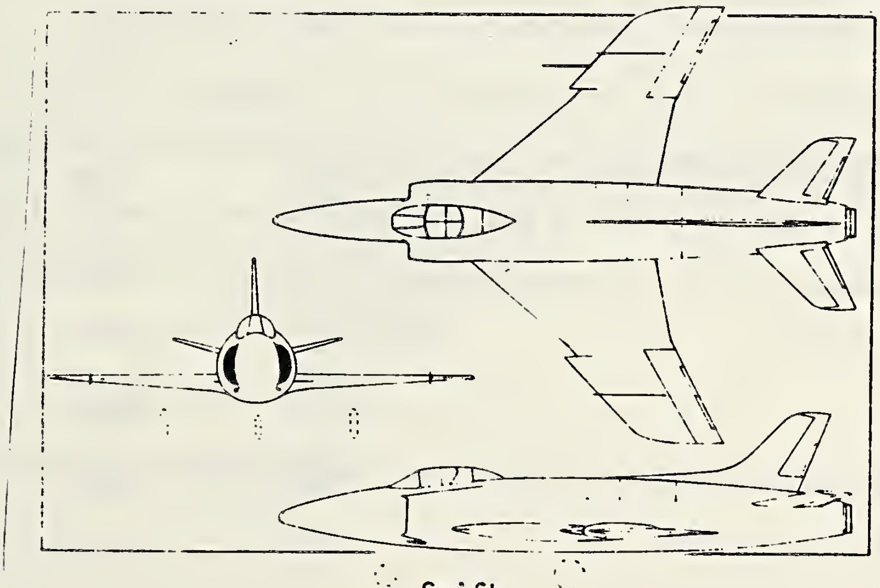
As previously covered, an important feature of United States aid was the off-shore procurement (OSP) financed as part of the Mutual Defense Assistance Programme (MDAP). Under this scheme, a portion of the money provided for the MDAP was used to purchase military equipment in countries other than the United States,the equipment then being given to one of America's allies (often the country of manufacture) for its military forces. By April, 1954, contracts placed by the United States in European NATO countries amounted to $1,727 million (not including $366 million of Special Military Support for France). The largest allocation was for ammunition ($852 million) with aircraft and related equipment ($366 million) and ships ($239 million) also accounting for considerable sums.[304]

The U.S. also contributed heavily to unilateral effort to foster NATO-wide R&D. Vandevanter reported in his 1964 Rand study that the U.S. spent in the mid-1950's alone more than $200 million[305] through its Mutual Weapons



Hunter

Source: Rand McNally



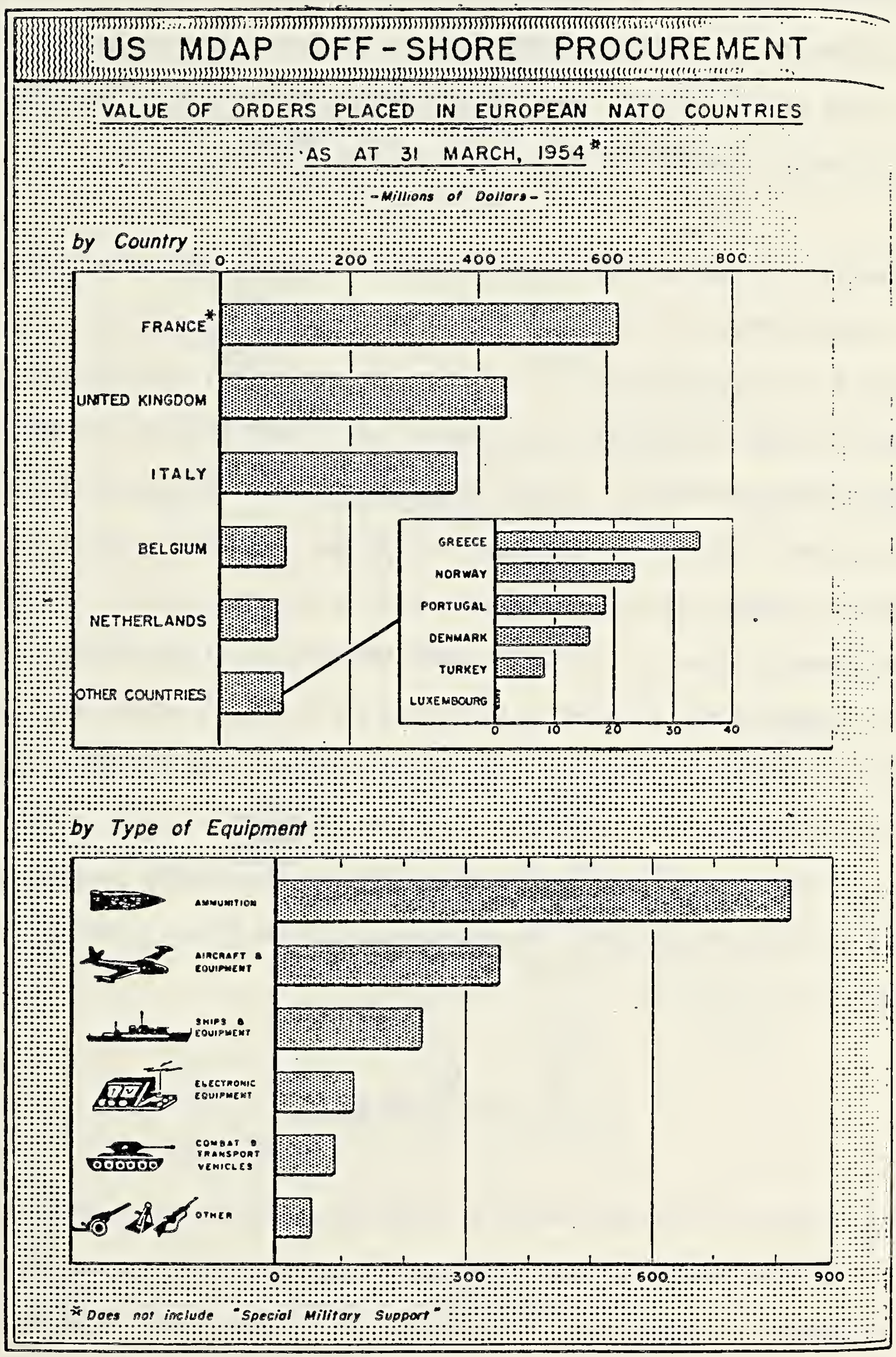
Swift

Source: Rand McNally

Development Program (MWDP) to underwrite the establishment of the SHAPE Technical Center, and to finance many individual European development projects.[306] Several of these development projects which were also involved in inter-allied industrial efforts are treated in this paper; the NATO Lightweight Strike Fighter (LWSR, or the Fiat G-91), the Atlantic Maritime Patrol aircraft, the Pegasus engine for the Harrier, and the RATAC ground surveillance radar. As previously pointed out earlier in this chapter, it was MWDP funding that launched the first two joint 'NATO' weapon system projects; the LWSR and the Atlantic.

For a program for the production of interceptor day-fighters, and certain other types of aircraft, contracts were signed in April 1953. Under these contracts, more than $550 millions worth of combat aircraft were built in five countries of Western Europe. About half the necessary funds were contributed by the United States under offshore procurement arrangements. The principal features of the program were the production of Hawker Hunter and Vickers-Armstrong Supermarine Swift aircraft in the United Kingdom, of Dassault Mystere fighter-bombers in France, the coordinated production of 445 Hunter aircraft in Belgium (Fairey) and the Netherlands (Fokker), under license from Hawker, and the assembly of American F-86K all-weather fighters in Italy by Fiat.[307]

The United States also provided technical military training for many European soldiers, sailors and airmen.



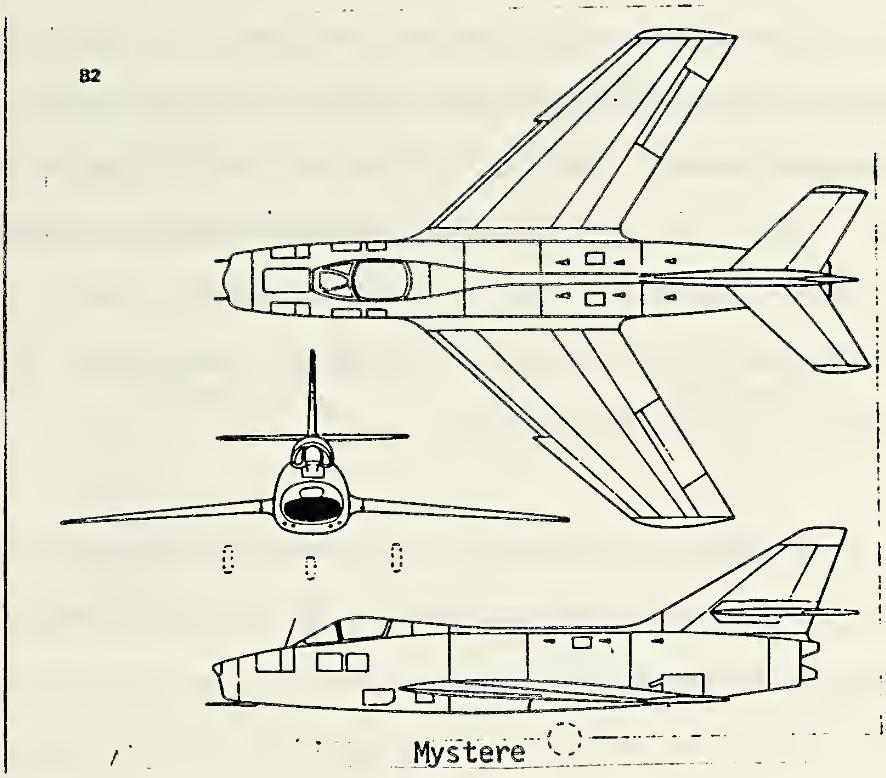
Source: Ismay

These dollar payments, be they through economic aid, intermediate type aid, NATO common infrastructure and MDAP-OSP/MWDP contracts, together with the dollar expenditures of United States forces and other personnel stationed in Europe, were to play a major role in mitigating Europe's most intractable postwar economic problem - the dollar shortage.[308]

The situation, of course was to reverse drastically in 1961 with the arrival of the Kennedy Administration and the on set of the U.S. gold crisis. At this point the U.S. changed direction and opted to not to follow through on its commitment to buy through OSP the products of it MWDP funding for NATO's first two weapon system projects: LWSR fighters for Greece and Turkey and Atlantic maritime patrol aircraft for Portugal and Norway. Instead the U.S. provided the countries concerned with equivalent U.S. produced aircraft. As part of the same general reversal, the U.S. ended its subsidy of any further multinational license production projects beyond the original batch, i.e. the Hawk, Sidewinder, and Bullpup missiles, the F-104G fighter, and the Mk.44 torpedo. Therefore, though the U.S. somewhat truncated these first joint projects after playing the key role in their launching, the new course had been set and a plethora of more purely joint European projects were to be launched from the mid-1960's on.

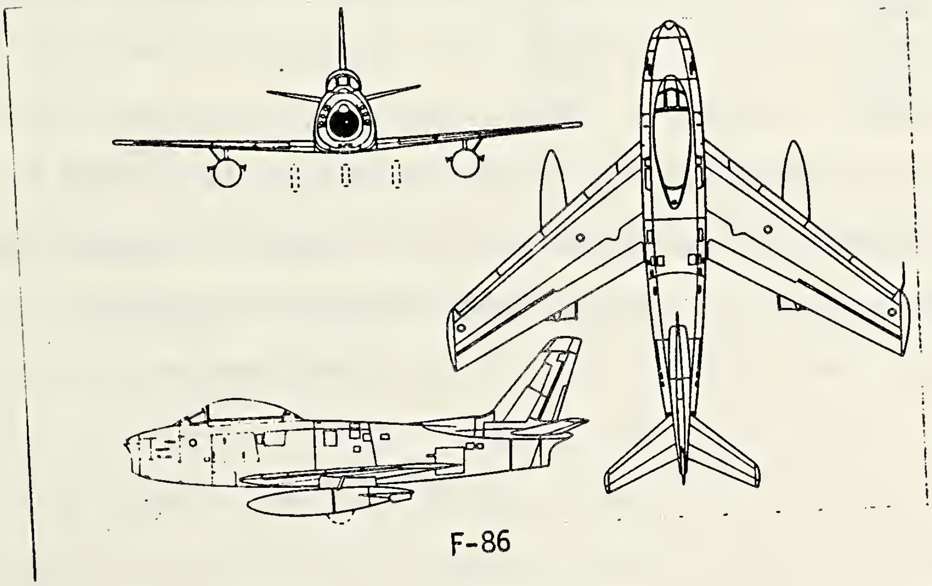
3. THE F-86 SABRE

The North American F-86 Sabre was the first jet fighter with a swept-back wing to be adopted by the USAF. Its introduction during the Korean War allowed the U.S. to regain air supremacy. The Sabre project began back in 1944, but once



Mystere

Source: Rand McNally



F-86

Source: Rand McNally

the war was over, and German research passed into the hands of the Allies, North American decided to radically modify the design. This led to the adoption of the swept back-wing. The first of the 'new' prototypes of the XP-86 flew on October 1, 1947. The overall shape remained virtually unaltered throughout the aircraft's evolution, modifications for variants were marginal and did not affect the basic architecture of the design. Propulsion was provided by one General Electric J47 engine.

The North American F-86 Sabre was flown by the Air Force of virtually all NATO member countries during the 1950's and into the mid-60's. Approximately 6,000 F-86's were built in the following variants:

Variant	Total Quantity Built	
F-86A	554	
F-86D	2,054	(981 later modified to F-86L's)
F-86E	336	
F-86F	2,540	
F-86H	473	
F-86K	341	

In addition to those produced by North American Aviation Inc.[309] the Sabre was built under license by the industries of 4 allied nations: Australia; Canada; Italy; and Japan. For the two that were NATO members this came to:

Canadair (Montreal)	1,815 aircraft
Fiat	221 aircraft

Most of the Canadian built variants of the F-86 were delivered to NATO members as U.S. grant aid. Of the 221 Fiat built Sabres, distribution to NATO members as U.S. grant aid broke down as follows:

Recipient Nation	Quantity Delivered
Italy	63
France	60
The FRG	88
The Netherlands	6
Norway	4

The 221 Fiat Sabre's were all built under U.S. Offshore Procurement (OSP) contracts and were of the F-86K variant. The license was between North American and the Italian government. The F-86K was a version of the Sabre developed by North American for the specific use of NATO countries. The F-86K prototype flew for the first time in July 1954, and was characterized predominantly by the use of four 20mm cannon instead of the D variant's air-to-air rockets. Fiat production started up in 1954 and continued into 1958, at which time production of the Fiat G-91 picked up (a fighter which outwardly resembled the F-86 and was therefore nicknamed the "Small Sabre"). Other examples of production under license in a European nation of U.S. systems are treated in Chapter 6 (covering Mode #1 of industrial collaboration).

As mentioned in Chapter 4, the F-86 was one of the five U.S. aircraft in the European inventories (be they U.S., Canadian or Italian built) for which the heavy spare parts and maintenance requirements were the impetus behind the U.S. initiative for setting up the NATO Maintenance and Supply Agency (NAMSA)

in the late '50's. Among the five aircraft involved, the F-86 logistic support requirements were larger than all the others put together. Much of the U.S. desire for such a NATO Logistics agency (generally called NPLO's) stemmed from this heavy European demand occurring simultaneously with a phase out of U.S. production.

4. IMPACT OF U.S. ASSISTANCE ON NATO'S CO-ORDINATED PRODUCTION EFFORTS

The first Assistant Secretary-General for Production and Logistics, Mr. David Luke Hopkins, an American business executive, had set about encouraging the development of what he called 'coordinated production' (by this he meant the voluntary pooling by member nations of information about production plans, including the Utilization of production facilities).

On the interesting and highly significant effect that the bilaterally implemented MDAP—the direct delivery of military equipment and the OSP contracts—had on the attempts to coordinate production on a multilateral basis through NATO institutions, Robert S. Jordan made the following observations. This quote includes excerpts from his book entitled, The NATO International Staff/Secretariat, 1952-1957, Oxford University Press, 1967, pages 256-9.

> Under Mr. Hopkins the International Staff/Secretariat ascertained the production positions of member countries, what stocks they had on hand, and what their needs were (this was done partly through the Annual Review). Then the Branch applied against this information equipment needs for the contemplated military forces (force goals). The International Staff/Secretariat had to perform such tasks as estimating the tonnage of stocks on hand and the consumption rates over a given period of time, and evaluating the efficiency of a production capacity which produced specified goods at a certain rate.310

Although this was important work—especially in the fields of ammunition, propellents, and explosives—it was not the co-ordinated production programme originally envisaged. Paradoxically, Mr. Hopkins found that he was severely limited in his endeavour by the overwhelming impact which his own country's production and supply policies had on the Alliance...The United States MDAP...was administered bilaterally, a Military Assistance Advisory Group (MAAG) was situated in each NATO country to collect its own information about the country's needs.... From 1952 to 1956 it could be said that the Production Branch....of the International Staff/Secretariat had to work in conjunction with the United States; there were few signs of a co-ordinated, multilateral effort.311

By April 1954 the value of equipment furnished by the United States to its NATO partners had reached about $15,000,000,000. Of this aid $1,700,000,000 had gone toward OSP. The OSP programme in effect, tended to pre-empt the second part of Mr. Hopkin's objective, just as bilateral direct assistance had pre-empted the first part302 (concerning national production capability, stocks, and needs). One weakness in this idea of co-ordinated production was the fact that, just as the Annual Review was sometimes held up until countries ascertained what part of their defense budgets would be augmented by United States Mutual Defense Assistance fund, so each country viewed production co-ordination in terms of its chances of obtaining contracts from the United States rather than from one another.313

The distribution of commodities obtained through OSP was controlled by the United States... However, the fact that control was held by the United States did not add to the authority of the Production Branch nor did it encourage the development of co-ordinated production.314

E. CONCLUSION - THE NEED TO EXPLORE OTHER DIMENSIONS OF THE SUBJECT AREA

So we see the approach taken by the U.S. in the implementation of its military assistance to Europe during the early and mid-50's, i.e. a bilateral approach, had its impact on the early Alliance-wide efforts. Basically, U.S. MDAP served to undermine any slight chance the Alliance had at this early formative stage to bring about an effective multi-lateral approach to the allied nations' equipment needs. Instead, although this U.S. financial assistance had a major role in launching such Alliance-wide efforts as the NATO

Infrastructure program (treated in Chapters 2 and 3) the NATO Maintenance and Supply Organization (NAMSO) (treated in Chapter 4), and in Chapter 5 we see that U. S. military assistance unintentionally contributed to the already strong tendency toward development of armaments collaboration along lines other than on an Alliance—wide basis. Initially supporting the early NATO projects, the U.S. intended that they be the forerunners of interallied collaboration on at least a Europe-wide basis. The course that these projects took however,—referring to the institutionally derived NATO projects (i.e., those interallied projects with a NATO label), as well as those without NATO sponsorship—served instead to be forerunners of an ad hoc approach to collaboration that will continue well into the future. This has led to the need to complement collaboration among groupings of allies with interoperability, while continuing efforts to reduce (not eliminate) the number of these competing groupings.

The number of these system-by-system groupings can be reduced by increased effort and understanding, which is obviously necessary. However, it is too much to expect that the multiplicity of systems can ever be eliminated, interoperability (I/O) will continue to be the only Alliance-wide solution responding to any given military requirement.

As such in its emphasis on I/O the official French position in the early 1980's is essentially more realistic. However, the French position is marred by its emphasis on a Europe versus the U.S. dichotomy in that for many European nations, collaboration with the U.S. in development and production for a given system or simply a unilateral approach will often continue to be a

more attractive alternative to a European approach. On this point the French are simply practicing what they are accusing the U.S. of, i.e., promoting the formation of the largest possible grouping of nations, within which they can effectively take a leadership role in promoting rationalization, and therefore their own predominance. On the other hand, the current U.S. drive to increase collaboration with its allies is commendable, and will surely bear fruit, though never Alliance-wide Standardization. A feasible approach is one that involves pushing collaboration so as to provide more rational use of resources as well as its standardization related economies, while also accepting the inevitability of a heavy emphasis on I/O, not only now, but for as long as the Alliance survives.

In Part II we will shift our focus from NATO to the project level in order to examine some of the know-how accumulated in the management of previous inter-allied projects within the loose framework provided by the 8 Modes of industrial collaboration that have developed within the North Atlantic Community.

Though national armaments policies vis-a-vis other NATO allies, and NATO organizations and procedures are all important for understanding NATO's relationship to national defense procurement, the most crucial level of management activity for most of us is at the project level—not the Alliance, or national level. This is where the ideological banner and acronym—NATO—takes on most of its meaning.

[1] It's important to remember that early joint development and production projects were also stimulated by the FRG, which allocated a considerable part of its proportionate share in joint programs to its other NATO partners. This was a function of: its lack of sufficient industrial capacity; a policy of identifying such efforts as NATO, not German; and the perceived need to act in a somewhat obsequious manner during the early phases of the post-war reintegration process.

[2] Brigadier General E. Vandevanter, Jr. USAF (RET.) Coordinated Weapons Production in NATO: a study of Alliance Processes The Rand Corporation, Santa Monica, California, 1964. pp.7-8.

[3] Robert S. Jordan, The NATO International Staff/Secretariat, 1952-1957: A Study in International Administration, Oxford University Press, London, 1967, p. 230.

[4] Lord Ismay, NATO the First Five Years: 1949-1954, Bosch-Utrech, the Netherlands, 1955, p. 127.

[5] Another 3,545 Meteors in various versions (Britian's first jet fighter) were produced by Gloster and Armstrong Whitworth between 1942 and 1954.

[6] World Aircraft: Military, 1945-1960, Rand McNally and Company, copyright 1978, p. 145.

[7] Over 4,000 de Havilland Vampires were built. In addition to France, they were also built under license in Australia and India. Following the Meteor, the Vampire was Britain's second jet fighter, first flying in April, 1945.

[8] In addition to the Dassault Ouragan, the Rolls Royce Nene engine also powered the following aircraft:

- Vickers-Armstrong Supermarine Attacker fighter;
- Armstrong-Whitworth Hawker Sea Hawk ground attack fighter, and;
- Mig-15 fighter.

The license production of Nene in the Soviet Union following a 1946 agreement with Rolls Royce was generally credited with allowing the Soviets to overcome years of lost time and major difficulties encountered in developing their own jet engines. Over 8,000 Mig-15's were built in the Soviet Union over the following five years. When the Korean War broke out the Mig-15 demonstrated its superiority over contemporary American jet-powered combat aircraft. Not until the introduction fo the F-86 sabre was the U.S. able to regain air superiority.

[9] This role of licensor and chief source of technology played by the UK and its aerospace industry, though critical in the early post-war period, was to be shortlived at the air frame level, as the U.S. came to assume the dominant role as foreign licensor. To be sure the French, and then later the Italians played their part during the 50's in limiting Britain's role as well, through the design and development of many of their own systems. In any event, Britain was to continue to be the source for a great deal of technology transferred to the continent, in the areas of aircraft engines and avionics through licensing and a later various joint development arrangements.

[10] Ismay, op. cit., p. 127.

[11] Jordon, op. cit., pp 230-1.

[12] Ibid., pp. 231-3.

[13]Ibid. p. 233.

[14]Ismay, op. cit., pp. 127-8.

[15]In 1966 the Standing Group was dissolved and its functions were absorbed by the Military Committee.

[16]Ismay, op. cit., p. 128.

[17]Francis A. Beer, Integration and Disintegration in NATO: Processes of Alliance Cohesion and Prospects for Atlantic Community, Ohio State University Press, 1969, p. 145.

[18]By the end of 1951 the DPB staff numbered 137 people.

[19]Jordon, op. cit., p. 238-9.

[20]Ibid., p. 237.

[21]NPLO's and NATO Steering Committees for specific projects, functions, and groupings of allied nations were to later offer an adequate alternative to this dichotomy.

[22]Ibid., p. 242.

[23]Ibid., p. 241, The International Staff/Secretariat performs the 'staff' (planning and programming), and the 'secretariat' functions. With the creation of the semi-autonomous-CEOA in 1957 as NATO's first subsidiary civil agency, a third function was added to NATO's international administration, outside of the International Staff/Secretariat. The CEOA was the first of what later came to be known as NATO Production and Logistics Organizations (NPLO's).

[24]This also entailed NATO's moving from London to Paris in 1952.

[25]Ismay, op. cit., p. 128.

[26]Ibid., pp. 128-9.

[27]Jordon, op. cit., p. 243.

[28]Jordon, op. cit., pp. 258-9.

[29]Ismay, p. 127.

[30]In June 1964, however, the French decided to revert to equipping their army with an automatic rifle using 7.5mm ammunition.

[31]Subsequently, the Belgian Fabrique Nationale d'Armes de Guerre designed a piece to fire 7.62 mm. ammunition, which was designated the standard NATO rifle. The new Belgian rifle was purchased by four allied governments, including Belgium, Britain, and Canada. (Beer, op. cit, p. 142.)

[32]Beer, op. cit. p. 142.

[33]Jordon, op. cit., p. 261.

[34]Ibid., p. 260.

[35]Vandevanter, op. cit., p. 10.

[36]Ibid., p. 246.

[37]Ibid, p. 252.

[38]Ibid, pp. 247-8.

[39]Ibid, p. 248.

[40]Ibid., p. 249.

[41]Vandevanter, op. cit. p. 10.

[42]Jordan, op. cit. p. 397.

[43]Jordan, op. cit. p. 250.

[44]Vandevander, op. cit., pp. 11-12.

[45]Jordan, op. cit. pp. 244-6.

[46]NATO Staff, "General Guidance for NATO Groups of Experts," Palais de Chaillot, Paris, 1955 p. 9, as quoted in Vandevanter, op. cit., p. 11.

[47]Ibid., p. 254.

[48]Ibid., p. 255.

[49]Vandevanter, op. cit., p. 13.

[50]Ibid.

[51]Jordan, op. cit., p. 255.

[52]Ibid., p. 262.

[53]Ismay, op. cit., p. 129.

[54]The evolution of this aspect of NATO institutional activity was covered in detail in Chapter 4.

[55]Ismay, op cit, p. 129.

[56]Ibid.

[57]Beer, op. cit., pp. 133-4.

[58]After the U.S. Sample Weapons Program of January 1957 had evolved into various multi-national weapons production programs such as Hawk and Sidewinder following the December 1957 heads of government meeting of the Council in Paris, their successful inception encouraged the U.S. to seek similar results with development programs through the new procedures, NATO Document, C-M(59)82. In 1960, in order to attract as many participants as possible the "Twenty Projects" were offered through NATO by the U.S. as potential joint or cooperative development programs. The Twenty Projects covered a wide variety of weapons systems whose development reflected the then current needs of the U.S. services and which appeared to lend themselves to a joint effort. To fix mutually acceptable development goals for such projects, NATO inaugurated working groups to establish joint military characteristics. The principal project eventually emanating (though indirectly) from this initiative was the MBT-70, in 1963. Discussion on some of these projects also took place outside NATO institutions.

[59]NATO Unclassified Document, C-M(66)33 (2nd revise) provides an explanation of the reasons behind the elimination of the 1959 organization, and procedures, and a description of the new ones. Also, the NNAG is the only Armament Group which has issued a document, Document AC/259-D/513, AC/141-D/324, covering (and entitled) "Policy Guidance, Organization and Method of Work for the NNAG and its Subordinate Groups."

[60]Beer, op. cit, pp 134-5.

[61]The three service Armament Groups are more commonly called NAAG (NATO Army Armaments Group), NNAG for the Navies, and NAFAG for the Air Forces.

[62]See the NIAG subsection of this chapter and several project histories in Vol. 2, e.g., ASSM, Seasparrow, AWACS, AIM-9L, Patriot and PHM for examples of how these groups operate.

[63]The recent activities of the TSGCEE were covered in section B.10 of Chapter 3.

[64] NATO Unclassified Document, C-M(66)33, p. 5.

[65] Ibid.

[66] Ibid., p. 6

[67] Ibid.

[68] Ibid.

[69] Ibid. pp. 6-7.

[70] Ibid., p. 7

[71] Ibid., p. 8.

[72] Ibid., pp. 8-9.

[73] In discussions during 1965 and 1966, the United States proposed the creation of an additional Group to handle Defense Logistics problems. The other countries did not accept the proposal, but the United States continue to support it. The United States views on this are expanded in document C-M(66)34. In the late 70's such a group was finally formed, the Senior NATO Logisticians Conference (SNLC). [74] The Armaments Committee and the Committee of Defense Research Directors disappeared, their higher functions being absorbed by CNAD. Their responsibility for promoting co-operative projects was taken over by the six Groups with their more routine tasks being undertaken by the NADREPS. Existing Ad Hoc Mixed Working Groups, Groups of Experts and other bodies and NBMRs promulgated under the Armaments Committee were re-allocated to the Service Armaments Groups on the basis of the Service having the major interest in each case. Long-term activities of any of the bodies under the Armaments Committee having no definite operational interest or being concerned only with technology were transferred to the new Defense Research Group for decision. Certain bodies, undertaking general activities of a logistics or administrative nature, were placed under the direct responsibility of the Conference. These have come to be known as Cadre Groups.

[75] C-M(66)33, op. cit., p. 10.

[76] Ibid., p. 13.

[77] Ibid.

[78] Ibid.

[79] Ibid., p. 14.

[80]Ibid., p. 15

[81] Ibid., p. 19.
[82] Ibid., p. 19.
[83] Ibid., pp. 19-20.
[84] Ibid., p. 23.
[85] Ibid.
[86] Ibid., pp. 23-24.
[87] AC/141-D/324, "Policy Guidance, Organization and Method of Work of the NNAG and its Subordinate Groups," p. 1.
[88] Ibid.
[89] Ibid., p. 1.
[90] Ibid., pp. 1-2.
[91] Ibid., p. 2.
[92] Ibid., p. 3.
[93] Ibid.
[94] Ibid., Annex I, p. 1.
[95] Ibid.
[96] Ibid., pp. 1-2.
[97] Ibid., p. 2.
[98] Ibid., p. 2.
[99] Ibid., pp. 2-3.
[100] Ibid., p. 3.
[101] Ibid., Annex III, p. 1.
[102] Ibid.
[103] Ibid.
[104] Ibid., p. 2.
[105] Ibid.
[106] Ibid.
[107] Ibid.
[108] Ibid., p. 3.
[109] Ibid.
[110] An example of an NNAG Pre-feasibility study is AC/141(IEG/1)D/92.
[111] Ibid., Annex IV, p. 1
[112] An example of an NNAG Feasibility study is AC/141(PG/16)D/1 for the Anti-Surface Ship Missile (ASSM).
[113] AC/141-D/324, op. cit., Annex IV, p. 1.
[114] Ibid., pp. 1-2.

[115] Ibid., pp. 2-3.

[116] Ibid., p. 3.

[117]Many other of these activities, however, didn't involve the establishment of anything more than international committees to supervise their implementation by national agencies.

[118]See Chapter 4.

[119]See chapters 7 and 13.

[120]See chapter 7.

[121]See chapter 8.

[122]See chapter 3.

[123]Examples of the actual charters granted for several NPLO's listed include NATO unclassified documents: C-M(64)13 for the Sidewinder air-to-air missile project; C-M(64)41 for the F-104G starfighter project; C-M(65)70 for the NADGE project; and C-M(71)19 for NICS.

[124]Interview with the NATO Legal Adviser, a Mr. Le Jeune, in June 1978.

[125]SHAPE (Supreme Headquarters Allied Powers Europe) on the military side of NATO obtains its status from the Paris Protocols of June 19, 1951, not the Ottawa Agreement of three months later. SHAPE therefore does not enjoy immunity of jurisdiction as does an NPLO on the civil side of NATO. For SHAPE, then, insertion of the arbitration clause is not mandatory as with an NPLO, but optional (Mr. Le Jeune, the NATO Legal Adviser).

[126]<u>NATO: Facts and Figures</u>, NATO, Brussels, 1976, p. 143.

[127]<u>NATO: Facts and Figures</u>, NATO, Brussels, 1976 p. 144.

[128]Having recently resigned, the NSIA was to select his replacement from among the remainder of the four officers previously nominated, and from whom Mann was designated.

[129]Of these 12 subgroups only 3 are in existence as of early 1980: SG/6, SG/11, and SG/12.

[130]The NATO Navy Armament Group (NNAG) refers to its subordinate project oriented groupings as 'project groups,' the NATO Air Force Armament Group (NAFAG) refers to theirs as 'subgroups' and the NATO Army Armament Group (NAAG) to theirs as 'panels.'

[131]"Fiber Optics Links for NATO Fleet Planned," Aviation Week & Space Technology, October 19, 1981.

[132]Ibid, p. 50.

[133]The 20 million Belgian francs allocated by NATO was apportioned to the participating firms in proportion to the man-days of effort contributed. The total estimated cost to industry was 50 million Belgian francs.

[134]Covered in Chapter 3 on pages 97-8.

[135]See pages 101-105 of Chapter 3 for an example of the development of one recent STANAG. Another recent STANAG is mentioned on pages 97 - 98 of this chapter con-cerning the activities of NIAG Sub-Group 6.

[136]Brown, 1980, op. cit. p. 83.

[137]In the late 70's AC/94 changed its name from the Working Group (WG) on Industrial Property to the WG on Intellectual Property, the name change reflect-ing a change of emphasis to a broader frame of reference.

[138]See pp. 104 - 106 covering NATO's Military Agency for Standardization (MAS).

[139]Brown, op. cit., p. 83.

[140]Eurogroup originally consisted of all European members of NATO less France, Iceland, and Portugal. Portugal later joined in 1976.

[141]William C. Cromwell, The Eurogroup and NATO, Foreign Policy Research Institute, Philadelphia, Penn., 1974. p. 1.

[142]Ibid.

[143]The FRG alone contributed 47% of this sum.

[144]Ibid., p. 18.

[145]As such EURONAD is also a subgrouping of NATO's Conference of National Armaments Directors (CNAD), including all its National Armaments Directors except those of the U.S., Canada, and France.

[146]Brown, op. cit.

[147]"Eurogroup Activity Increased", Interavia: Air Letter No. 9433, February 5, 1980, p. 7.

[148]The variance around this mean for any given nation can be very high.

[149] Brown, op. cit., p. 94.

[150]Brown, 1980, op. cit., p. 61.

[151]Brown, 1980, op. cit. p. 6.

[152]Ibid.

[153]Ibid. p. 1.

[154]Brown, 1978, op. cit., p. 18.

[155]Ibid. pp. 18-19.

[156]Ibid, p. 19.

[157]Ibid.

[158]Brown, 1980, op.cit., p. 6.

[159]Ibid.

[160]John S. W. Fargher, Jr and Dr. Murray Geisler, "NATO RSI Planning Systems," DISAM Newsletter, Vol. 4, No. 2, Winter 1981-82, p. 85.

[161]John Fargher, International Integrated Logistics Support (I^2LS), Proceedings from the 16th Annual International Symposium of the Society of Logistics Engineers, August 24 - 28, 1981, Seattle, Washington, p. 2.

[162]Ibid.

[163]Brown, 1980, op.cit., p. 59.

[164]Fargher, op.cit., p. 2.

[165]Fargher and Geisler, op.cit., p. 90.

[166]Fargher, op.cit., p. 2.

[167]Fargher and Geisler, op.cit., pp. 90-91.

[168]Ibid., p. 91.

[169]Ibid.

[170]Fargher, op.cit., pp 3-4.

[171]Fargher and Geisler, op.cit., pp 92-93.

[172]Brown, 1980, op. cit. p. 62.

[173]C-M is the acronym for Council Memorandum (i.e, North Atlantic Council) which are official NATO-wide multilateral protocols or memorandum of understanding (MOU's). The number in parenthesis gives the year in which the CM was approved, and the final number is the number of the document for the given year.

[174]Vandevanter, op. cit., p. 18.

[175]A U.S., UK, and France executive entity abolished in 1966 with France's withdrawal from the integrated command structure on the military side of NATO.

[176]Ibid., p. 18.

[177]"NATO Lightweight Fighter", NATO Letter January, 1959, pp. 18-19.

[178]"US Grants Aid for NATO Light Fighter," Aviation Week, August 15, 1955, p. 27.

[179]"Fighters Compete for NATO Approval," Aviation Week, September 30, 1957, p. 28.

[180]Ibid.

[181]Ibid., p. 26.

[182]The Atar was to later power the Mirage III/5 fighter, the Mirage IV strategic bomber and early versions of the Mirage F-1.

[183]According to Robert Rhodes James the French were evidently given to understand that their projects were too sophisticated, and were promised the NATO designation for the next generation of such aircraft. When the decision for the G-91 replacement, NBMR 3 came up, however, the French were to be told that their project was not sophisticated enough.

[184]The North American F-86K Sabre all-weather interceptor-fighter was built in Italy by Fiat, under the licensing agreement between North American Aviation and the Italian Government. Production of the F-86K was completed in 1958 (as the similar G-91 production was beginning) after Fiat had built 221 Sabres for six NATO air forces under U.S. Offshore Procurement (OSP) contracts.

[185]"Reports Hint NATO Favors G-91 Over Four French Light Fighters," Aviation Week, December, 1957, p. 37.

[186]World Aircraft, Rand McNally, op. cit., p. 275.

[187]Ibid.

[188] Ibid.

[189]The fact that no British designs were selected to be among the final contenders would suggest that a premium was placed on the prototypes being of not simply European, but of continental origin.

[190]Developed privately by Bristol (up till the U.S. contributed four million dollars through the MWDP in the summer of 1955) starting in late 1953, the Orpheus was bench-tested in December 1954 and had its first flight test in July 1955 in the Folland Gnat prototype. The Orpheus was later to be instrumental in the resurrection of another aerospace industry in the post war period. The first forty of the total of sixty T1F advanced trainers designed, developed and produced for the Japanese self-defense forces by Fuji Industries were fitted with the Orpheus.

[191]World Aircraft, Rand McNally, op cit., p. 192.

[192]Ibid., pp. 192-3.

[193]Ibid. p. 193.

[194]Beer, pp. 139-140.[195]Brig. Gen. Elliot Vandevanter, Jr., USAF (Ret.), International Logistics Interallied Collaboration in Weapons Production, the Rand Corporation, Santa Monica, California, 1964, p. 19.

[196]Ibid. pp 19-20.

[197]For now at least, I'll settle for defining transnational projects, (or enterprise), as those high technology projects in which there is a dual consortium, a consortium of procuring governments and a consortium of their national industries sharing risk and management responsibilities for the given project.

[198]The DPC was replaced by the Armaments Committee in 1959, and by the Council of NATO Armaments Directors (CNAD) in 1966.

[199]AC is the NATO acronym for 'Allied Committee'.

[200]Once again, the Anglo-American-French Standing Group located in Washington, D.C., was abolished in 1966, with French withdrawal from the integrated military command side of NATO.

[201]A. H. Cornell, An Analysis of International Collaboration in the Organization and Management of Weapons Coproduction, American University, Washington, D.C., distributed by NTIS, March 31, 1969, p. 228.

[202]Bloch, M. R., "Le Programme Breguet 1150 'Atlantic'," Organization des Programmes Internationaux de Production Integree II, Universite de Liege, 1965.

[203]The U. S. Government originally excluded the participation of U. S. firms, later reversing itself at the last minute, but too late for adequate proposal preparation by U.S. industry - effectively excluding it. Though never explicitly stated in any of the 5 project histories this one draws upon (Cornell, James, Vandevanter, Bloch and Tavernier or any of the several periodical sources, it appears the Atlantic was not intended to be an Alliance-wide project, but a European one. The U.S. was committed to its

competing Lockheed P-3 Orion project. The P-3 utilized the Lockheed Electra airframe originally developed for commercial air transport.) There was however, some ambiguity in the U.S. position as it fluctuated over time with regards to participation in development towards an eventual procurement of the system for the use of its own armed forces or through MAP for the use of the armed forces of European NATO allies. This generally reflected the U.S. foreign policy shift in the early 1960's from one of assistance to Europe, to one of an arms salesman, in order to offset gold flow problems.

[204]As a point of interest, it has previously been agreed that no argument was admissible for use in the final selection decision by the Group if it had not been previously directed to the firm concerned (i.e., so as to allow for rebuttal of all critical evaluation).

[205]"Ubootbekaempfung mit der Atlantic," Interavia, 1/1969, pp. 63-64.

[206]Cornell, op. cit., p. 243.

[207]Quoting from Cornell, p. 241,

> According to an experienced expert and active French participant in the project, Mr. P. Woirin of the NATO Defense Support Division, the Atlantic program may have committed its first 'faux pas' at that point. Reflecting upon the overall execution of the project, Mr. Woirin felt strongly that such financial agreements, including financial control procedures, should always be concluded before any contracting is culminated.

(From a personal interview at NATO Headquarters, Brussels, with P. Woirin on 22 October, 1968. M. Woirin is a long experienced official with the Aircraft Section, Defense Support Division on NATO.)

Although a valid point, this also ignores the not uncommon necessity in such projects of one nation taking the initiative, unilaterally, in order to maintain momentum.

[208]Cornell, op. cit., p. 246.

[209]Aviation Week and Space Technology, March 11, 1968, p. 18.

[210]Norway stated in March 1964 that its 6 aircraft requirements had been satisfied, having received U.S. P-2 Neptunes instead of Atlantics. This again reflected the 1961 'gold flow' crisis and policy shift in the U.S. armaments policy vis-a-vis Europe which had represented a change from assisting European defense industries to one of competing with them in their home markets so as to offset a heavily negative dollar flow.

[211]Pakistan later acquired three refurbished Atlantics second hand from the French Navy.

[212]James, op. cit., p. 12. Scepticism has been expressed from some quarters with regards to this latter point based on the fact that, with the way in which the program is organized and managed, the cost data is entirely in the hands of the French. They, therefore, had the opportunity to hide overruns, if they wished to do so, making the money up out of their own pockets. This example of scepticism is of interest not so much as to whether its true or not, but for its representing the lack of mutual trust and confidence that always surfaces in some quarters doing such programs.

[213]Belgium, France, the FRG, and The Netherlands.

[214]Cornell, op. cit., pp.257-8.

[215]Ibid., p. 300.

[216]Ibid., p. 264.

[217]Bloch, op. cit., p. 79.

[218]Cornell, op. cit., p. 226.

[219] Aviation Week & Space Technology, "Atlantic Governments Overcomes Nationalism Barriers" June 10, 1963, p. 73.

[220]Ibid.

[221]Bloch, op cit. p. 77.

[222]NATO Document CD-D/66, as quoted in Cornell, op. cit, p. 268.

[223]Cornell, op. cit., p. 318.

[224]Ibid., p. 310.

[225]Ibid., p. 269.

[226]Ibid., pp 294-5.

[227]Ibid., p. 269.

[228]Bloch, op. cit., p. 83.

[229]Rene Bloch, "NATO's Firstborn: The Atlantic" Journal of the Royal Aeronautical Society, Vol. 67, No. 627, March, 1963, p. 171.

[230]Boeing International Corporation (BIC) internal memo by C. H. Slater, Jr., dated 28 April, 1965, pp. 4-5.

[231]NATO Document CD-D/66, p. 8, as quoted in Cornell, p. 281.

[232]Cornell, op. cit., p. 282.

[233]Michel Tavernier, "Le Programme Breguet 1150 'Atlantic,'" Organization des Programmes de Production Integree, Universite de Liege, 1964, p. 75.

[234]Ibid. p. 71.

[235]Cornell, op. cit., p. 309.

[236]Tavernier, op. cit., p. 80.

[237]Bloch, op. cit., p. 81.

[238]Within Seeflug Dornier was lead firm, carrying out the design and development work itself. Dornier passed on to Siebel (a firm since merged into MBB) work on the fins for production. For the operation and support phase Seeflug was disbanded and Dornier assumed full responsibility as prime to BWB for that portion of the work distributed through national channels.

[239]ABAP, Association Belge pour L'Avion Partrouilleur, itself was a grouping of Belgium's two aerospace firms that have participated in such other major projects as the F-104G Starfighter and the F-16: Fairey (now SONACA) and SABCA.

[240]Cornell, op. cit., p. 301.

[241]Rolls Royce, as originator of the system, was sole producer of the Tyne engine for prototype production. Work was distributed through licensing to the other nation's firms for series production, however.

[242]"Single Chain of Command Aids Atlantic Consortium," Aviation Week & Space Technology, June 14, 1965, p. 26.

[243]Ibid., p. 24.

[244]Cornell, op. cit., p. 250.

[245]Gunter Fischer, interview with the author in September 1981. Mr. Fischer was formerly Dornier's Atlantic Program Manager for the operation and support phase of the program from 1968 to 1978, and is currently serving as Dornier representative at Boeing, in Seattle, for the NATO AWACS program.

[246]Ibid.

[247]Actually for the first three or four years (before the Dutch or Italians joined in) the Germans used the French forms, be they translated. However, due to legal problems that arose, and the need to sift SC/Aero Tech generated change orders as to their appropriateness to Bundesmarine requirements, this practice was discontinued.

[248]Fischer, op.cit.

[249]NATO Document CD/D/66, p. 8 as quoted in Cornell, op. cit., p. 248.

[250]Aviation Week, June 14, 1965, op. cit., p. 25.

[251]Cornell op. cit., p. 310.

[252]Robert Rhodes James, Standardization and Common Production of Weapons in NATO, Volume No. 3, Defense, Technology, and the Western Alliance, The Institute for Strategic Studies, London, July 1967, p. 13.

[253]New Maritime Patrol Aircraft, North Atlantic Treaty Organization Information Service, Paris, NATO LETTER, Vol. 8, No. 3, March 1960, p. 12.

[254]Cornell, op. cit., p. 324.

[255]"Atlantic Nouvelle Generation" International Defense Review, 1/1979, p. 115.

[256]Ibid.

[257]"Fokker Readying to Absorb VFW Split," Aviation Week and Space Technology, Oct. 30, 1978, p. 31.

[258]"Fokker Still Waiting Government Approval for F-29 Project", Aviation Daily, Nov. 22, 1978, p. 119.

[259]Production had recently been restarted for the Mk22 Tyne for the relaunched Transall line, as well.

[260]"Dutch P-3C Purchase Worth $150 Million to Lockheed," Aerospace Daily, Dec. 26, 1978, pp. 247-8.

[261]"Atlantic Nouvelle Generation" op. cit., p. 115.

[262]"Up-dating the German Atlantic Aircraft," Dornier Post, 4/1980, p. 20.

[263]The corrosion problems were overcome by the adoption of new honeycomb cores and bonding materials. It is now assumed that the life of 10,000 hours forecast for the aircraft will in fact be obtained. As of early 1979 the fifteen reconnaissance aircraft had recorded an average of 3,650 flying hours each and thus had another 6,350 hours to go, which means that they can remain in service until the beginning of 1990.

[264]"Updating the German Atlantic Aircraft," op. cit.

[265]Udo, Thenhausen, "Modernization Programme for the Breguet Atlantic', Dornier Post, 3/1979.

[266]James, op. cit., pp. 9-10.

[267]Vandevanter, op. cit., p. 22.

[268]Ibid., p. 23.

[269]Ibid. p. 23.

[270]Ibid., pp. 23-25.

[271]Ibid.

[272]Ibid.

[273]Ibid.

[274]Ibid., p. 26.

[275]Ibid.

[276]Ibid., p. 27.

[277]"Carrot from NATO," Economist, Nov. 25, 1961, p. 830.

[278]"Republic Joins Consortium Formed for NATO Fighter Contest" Aviation Week & Space Technology, Nov. 27, 1961, p. 28.

[279]Vandevanter, op. cit., p. 21.

[280]The P-1127 was to be a supersonic version of what later became the Harrier.

[281]The UK opted for a single internal engine with nozzles to be swiveled for providing both lift and forward thrust; France depended on two different sets of internal engines, and the FRG went for the mounting of a rotatable engine on each wing tip. A fourth European nation, Italy, evidently dropped is own version and decided to tie in with the FRG. As is the norm, the U.S. was meanwhile experimenting with several different principles. (Vandevanter, op. cit. p. 31.)

[282]A.H.C. Greenwood, "MRCA - The Future System of Military Procurement," Royal United Services Institute (RUSI) Journal for Defense Studies, Vol., 117, Jul/Sept., 1972, p. 7.

[283]Though a Cecil Brownlow, in "NATO Disputes Stall Follow-on Projects," Aviation Week and Space Technology, March 16, 1964 reported that negotiations on NBMR-4 fell through because the U.S. wouldn't promise any financial support to build the prototype (the U.S. position in this regard had changed drastically from 1959 when the Atlantic was launched and 1962 when NBMR4 was to be launched), Vandevanter reported that American officials maintained that the U.S. financial backing had never been a "go or no-go" consideration. (Vandevanter, op. cit, p. 26.)

[284]NBMR 3 again provided an example of the level that such 'NATO' competitions can descend to. A vocal press is apt to whip up sentiment to a point where national negotiators retain little leeway for bargaining. The V/STOL fighter struggle reached its climax at the 1963 Paris Air Show, when the British challenger, the Hawker P-1127, was pitted against its French counterpart, the Balzac (test vehicle for the Mirage III-V). When the British aircraft crashed, the British press, closely identifying itself with the project, treated the accident as a national catastrophe. While the French press, for its part, interpreted it as a significant victory for France. (Vandevanter, op. cit., p. 38)

[285]Vandevanter, op. cit., pp. 31-2.

[286]Vandevanter, op. cit., pp. 27-28.

[287]One might add a further distinguishing characteristic of the Atlantic vis-a-vis NBMR's 3 and 4. A maritime patrol aircraft is not a high prestige item, nor would its potential production run ever involve the sort of numbers that a fighter or transport aircraft would.

[288]Vandevanter, op. cit., p. 31-2.

[289]Ibid., p. 28-9.

[290]Ibid., pp. 33-4.

[291]Ibid., pp. 29-30.

[292]James, op. cit., p. 10.

[293]No small matter considering that all NATO nations face a differing combination of perceived and real threats to their national security and economic livelihood, and therefore differing requirements, let alone being sovereign nations at that! NATO represents an alliance, the Warsaw Pact a colonial empire.

[294]Eugene Kozicharow, "European Defense Unity Pushed," Aviation Week & Space Technology, March 5, 1979, p. 14.

[295]Ismay, op. cit., p. 135.

[296]Ismay, op. cit., p. 135.

[297]Ibid.

[298]Ibid.

[299]Ibid.

[300]Ibid. p. 135-6.

[301]Ibid. p. 136.

[302]Ibid.

[303]Ibid.

[304]Ibid., p. 139.

[305]Vandevanter, op. cit., p. 76.

[306]This was discontinued in the early 1960's with U.S. complaints of a 'one-way street' followed by a shifting to a policy initially known as

"complementry" and later as "cooperative development" wherein a project was carried out unilaterally in one country with the co-funding of 2 or more allies interested in eventually procuring the system either through direct purchase or license production.

[307]Ismay, op. cit., p. 139.

[308]Ibid.

[309]North American merged with Rockwell in 1967 to become North American-Rockwell and then in turn, several years later was renamed Rockwell International (1973). The latter decision involved a conscious effort to change the firm's image and reflect more of a world-wide frame of reference for its activities.

[310]Jordon, op. cit., p. 256.

[311]Ibid., pp. 256-7.

[312]Ibid., p. 259.

[313]Ibid., p. 259.

[314]Ibid., p. 258.